

SKY'S THE LIMIT

Smithsonian

September 2015 | smithsonian.com

THE 21ST-
CENTURY

LIFE

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LIST

THE
25
GREATEST
NEW PLACES
TO SEE

PLUS

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IN JAMESTOWN

CHASING THE
SPIRIT BEAR

ESCAPE FROM
BOKO HARAM

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The Spirit Bear

The rare white Kermode bear of British Columbia is galvanizing First Nations people fighting to protect their homeland

BY ALEX SHOUMATOFF



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Discussion

Gorgeous, moving work on survivors of the #ArmenianGenocide from @dianamarkosian in @SmithsonianMag

@hollypickett ON TWITTER

FROM THE EDITORS Readers agreed that Paul Theroux's journey to Harper Lee's hometown ["Return of the Mockingbird"], which sparked thousands of shares on Facebook, was sensational. "Thank you," Linda Messner wrote, "for your beautifully written portrait of Monroeville, Alabama." The photography project Past and Presence stirred strong emotions. Dozens of readers criticized "The Vigil," which showcases Jon Lowenstein's images of the 2014 protests in Ferguson, Missouri, following the police killing of Michael Brown. Even though our story was intended to focus on the cultural consequences, the main criticism was that it did not provide a more complete account of the incident itself. The text was "extremely one-sided," Tony Oberdorfer wrote, because it failed to mention the demonstrators who looted stores and destroyed property. Likewise, Patricia Talley said we "should have shown the violence that occurred and the aftermath." Others felt that our characterization that a grand jury "declined" to indict the officer seemed loaded. As Thomas Stepnowski pointed out, "there was insufficient evidence to charge the officer with violating Michael Brown's civil rights." Diana Markosian's photographs of Armenian genocide survivors ["The Endless Exile"] were inspiring: "My grandmother was a survivor... I know firsthand what it's like to grow up with someone so traumatized by such atrocities," Sydney Keller wrote. One tribute to Markosian's work expresses our hopes for the photo package as a whole: "I'm glad someone is remembering," Helen Noakes wrote, "because the world seems to have forgotten."



Wrath of Vesuvius

As an antiquity buff I am always excited to read your articles, written in such depth that I can establish my own tour itinerary from just your narrative alone. I am so happy that at last serious reconstruction programs have been undertaken at Pompeii and Herculaneum ["The Fall and Rise and Fall of

Pompeii"]. My first visit to Pompeii, in 1964, was filled with both exhilaration and wonder, yet with a nagging sense that there had to be more to that place. I returned in 1979 only to feel that it had regressed. Herculaneum was not promoted as a site to visit on my earlier trips, but now

my interest has been tweaked by your article and I am ready to return to the Bay of Naples, where I will certainly visit Herculaneum.

Ernest Kallen

SCOTTSDALE, ARIZONA

Italy's economy is in great despair. They can't afford to take care of history. Many business people are paying for restoration to many areas such as the Spanish Steps out of their own pockets. Hopefully Pompeii is on someone's list.

Mary Jo Nosek Galen

FACEBOOK

Read, Ho!

When I was young and my father and I went fishing, he'd tell me stories by Rudyard Kipling and Jules Verne. He could recite Longfellow's narrative poems from memory. By the time I was in junior high he'd given me *The Virginian*, *Shane* and Sherlock Holmes.

Two Years Before the Mast, by R. H. Dana Jr. ["The Young Man and the Sea"], was one of Dad's recommendations that I'd never read. After seeing your article, I got the book at our local library and read this technically detailed account with fascination, impressed by the language and observations of sailing. I felt my father's presence, his love of explorations and adventures while I read. It was an unexpected joy.

Rosemary Dunn Moeller

ST. LAWRENCE, SOUTH DAKOTA

Magna Carta

The Magna Carta was even more revolutionary than most people realize ["The Mad King & Magna Carta"]. Kings had often made proclamations of their good intentions to maintain the law of the land. But this charter was different. It had an enforcement clause. The king was not above the law and would be punished by an elected assembly if he broke it. Is it any wonder that John repudiated the charter? Or that the likes of John Locke and Thomas Jefferson saw it as an inspiration for the idea of a social contract between the governed and the governing?

William Stevenson

HUNTSVILLE, ALABAMA

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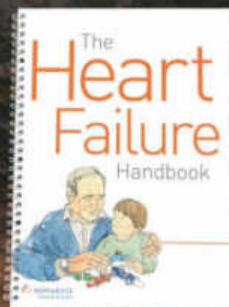
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Contributors



Marilyn Johnson

The acclaimed author of *Lives in Ruins: Archaeologists and the Seductive Lure of Human Rubble*, which was named one of the 100 best books of 2014 by *Publishers Weekly*, says her article about Jamestown (p. 68) felt like the missing chapter she never wrote. “It’s such a fascinating place,” she says. “I want readers to understand that the past is a wilderness and it’s still being discovered. Although it seems like old history, in fact the argument about what happened in the past continues to be relevant today.” Johnson has written two other books, including *The Dead Beat*, about obituaries.

Jamie Malanowski

“It was astonishing to see the variety of amazing sites that are out there,” the writer and editor says of his article about our surprising new bucket list (p. 25). “Through technology, the world has gotten so much smaller and the range of interests has gotten bigger, enriching our possibilities.” Malanowski has published seven books, including, most recently, *Commander Will Cushing, Daredevil Hero of the Civil War*. He also wrote for the *New York Times* Civil War blog, *Disunion*.

ILLUSTRATIONS BY Marcel George

Melissa Groo

The award-winning photographer, who lives in Ithaca, New York, was anxious about whether she would be able to find a Kermode bear when she ventured to British Columbia (p. 40) to chronicle the extraordinary animal in its only habitat. “Whenever I travel, I’m assured where I’m going I will find that species,” she says. But only after hours of waiting did a bear and her cub finally appear—and Groo felt a huge wave of relief. “It was like being served the Holy Grail,” she says. Groo was recently named the Audubon Photo Contest Grand Prize Winner and has an upcoming show, “For the Love of Wildlife,” at the Cooper-Meier House in Ithaca. Her work has also been published in *National Wildlife*, *BirdWatching* and *Montana Outdoors*.



Benedicte Kurzen

Based in southwest Nigeria, the French documentary photographer has been taking pictures in the country for six years. For this assignment (p. 56), Kurzen was challenged to portray girls who evaded or escaped from Boko Haram and also protect their identities: “It is a necessary and ethical duty we have to preserve the anonymity of women and girls who have gone through such a horrendous experience,” says Kurzen.

Bill Finch

The lead horticulture and science adviser to the Mobile Botanical Gardens in Alabama takes a weed whacker to the conventional wisdom about kudzu, the much-hyped scourge of the South (p. 19). “People only believe the myth of kudzu because it’s all they see from inside their cars while driving down the interstate,” says the conservationist. “Really understanding the landscape requires getting out of the car and exploring the surrounding area.”

Alex Shoumatoff

Though he has traveled the world in pursuit of stories for the *New Yorker*, *Outside* magazine and *Vanity Fair*, he had never visited the British Columbia coast until his assignment to cover the rare Kermode bear (p. 40). The biodiversity of the Great Bear Rainforest amazed him: “It was a mystical feeling to see all these different life-forms, both marine and forest animals, interacting with each other,” says Shoumatoff. “There aren’t many places left like that.”



Douglas Brinkley

In his book *The Great Deluge* Brinkley documents what he witnessed when Hurricane Katrina struck the Gulf Coast. Now, for its tenth anniversary, he revisits the disaster in an essay about a piece of a broken New Orleans levee obtained by the Smithsonian National Museum of American History (p. 54). “The biggest challenge was reopening the wounds of Hurricane Katrina,” says Brinkley, a history professor at Rice University and author of many best-selling books.

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WORKS BY LEGENDARY HOLLYWOOD PHOTOGRAPHER
RICHARD SCUDDER



Richard Scudder

Phenomena

A CURATED LOOK AT SCIENCE, HISTORY & CULTURE

How a PR
gimmick
became a
patriotic vow

by Amy Crawford

Anatomy of an Oath

On the morning of October 21, 1892, children at schools across the country rose to their feet, faced a newly installed American flag and, for the first time, recited 23 words written by a man that few people today can name. “I pledge allegiance to my Flag and to the Republic for which it stands—one nation indivisible—with liberty and justice for all.”

Francis Bellamy reportedly wrote the Pledge of Allegiance in two hours, but it was the culmination of nearly two years of work at the *Youth's Companion*, the country's largest circulation magazine. In a marketing gimmick, the *Companion* offered U.S. flags to readers who sold subscriptions, and now, with the looming 400th anniversary of Christopher Columbus' arrival in the New World, the magazine planned every Public School from the Atlantic to the Pacific”

ing 400th anniversary of Christopher Columbus' arrival in the New World, the magazine planned every Public School from the Atlantic to the Pacific” and salute it with an oath.

Chicago schoolkids pledge allegiance in 1963.

AMERICAN ICON



Bellamy, a former Baptist preacher, had irritated his Boston Brahmin flock with his socialist ideas. But as a writer and publicist at the *Companion*, he let 'em rip. In a series of speeches and editorials that were equal parts marketing, political theory and racism, he argued that Gilded Age capitalism, along with “every alien immigrant of inferior race,” eroded traditional values, and that pledging allegiance would ensure “that the distinctive principles of true Americanism will not perish as long as free, public education endures.”

The pledge itself would prove malleable, and by World War II many public schools required a morning recitation. In 1954, as the cold war intensified, Congress added the words “under God” to distinguish the United States from “godless Communism.” One atheist, believing his kindergarten-aged daughter was coerced into proclaiming an expression of faith, protested all the way to the Supreme Court, which in 2004 determined that the plaintiff, who was not married to the child’s mother, didn’t have standing to bring the suit, leaving the phrase open to review. Still, three of the justices argued that “under God” did not violate the constitutional separation of church and state; Sandra Day O’Connor said it was merely “ceremonial deism.”

Today, 46 states require

public schools to make time for the pledge—just Vermont, Iowa, Wyoming and Hawaii do not. It’s a daily order of business for the U.S. Senate and House of Representatives. And hundreds of thousands of newly minted citizens pledge allegiance each year during the U.S. naturalization ceremony. The snappy oath first printed in a 5-cent children’s magazine is better known than any venerable text committed to parchment in Philadelphia.

Yet the pledge continues to have its critics, with some pointing out the irony of requiring citizens to swear fealty to a nation that prizes freedom of thought and speech. The historian Richard J. Ellis, author of the 2005 book *To the Flag: The Unlikely History of the Pledge of Allegiance*, acknowledges that the oath is “paradoxical and puzzling,” but he also admires the aspirational quality of its spare poetry. “The appeal of Bellamy’s pledge is the statement of universal principles,” he says, “which transcends the particular biases or agendas of the people who created it.”

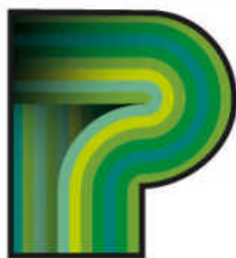
Bellamy did some transcending of his own. The onetime committed socialist went on to enjoy a lucrative career as a New York City advertising man, penning odes to Westinghouse and Allied Chemical and a book called *Effective Magazine Advertising*. But his favorite bit of copy remained the pledge—“this little formula,” he wrote in 1923, with an ad man’s faith in sloganeering, which “has been pounding away on the impressionable minds of children for a generation.”



Tricked Out

A new photography collaboration aims for an unbearable lightness

DIMITRI DANILOFF AND SVEN HAUTH





ART

Isn't gravity a drag? Sometimes it can feel that way, but if you look at this sprightly image you might not feel so weighed down. It was taken by the French-born photographer **Dimitri Daniloff**, who got the idea for the work after seeing children climbing giant nets in a park in Hakone, Japan—"playing with gravity," he realized. He photographed members of the Villarreal "tricking" team practicing on the beach in Castellón, Spain, enthusiasts of a sport combining the acrobatic

stunt-walking of parkour with a flip-happy style of gymnastics. The net was added later using computer graphics software by **Sven Hauth**, a German digital artist, as part of a series they call "Meshology." Consider the whimsy of a leaping body gracefully entangled in Hauth's bright green, elastic-looking net as an invitation to play in any way you want, laws of physics be damned. "I like to question what is possible," Daniloff says, "and what is real." —**BRITT PETERSON**



SMALL TALK

Andy Weir

Author of *The Martian*, about a man stranded on the Red Planet. The film version, directed by Ridley Scott, is out next month.

What are the best stories about survival against all odds?

My favorites are *Robinson Crusoe*, by Daniel Defoe, and *Tunnel in the Sky*, by Robert A. Heinlein. And for a film, *Apollo 13*.

Is our love for those kinds of stories rooted in fear or fantasy?

A bit of both. We live complex lives, and a survival situation simplifies everything. Though it would be terrifying, it would not be boring, and there's no moral ambiguity. Survive. That's your job.

When will humans first set foot on Mars?

My guess is around 2050 for the first manned landing. But colonizing Mars would be a momentous undertaking. That won't happen for a long time. I'd guess 2200.

Do you think there's life somewhere else out there?

Probably. There are just so many planets. But the nearest non-Earth life might be a million light-years away, for all we know.

How do you think society will be different in 100 years?

People always have gloomy predictions about the future, but ask yourself this: Would you rather live now or during any previous century? I'd choose now. We have vaccines, the Internet, the ability to transplant hearts. This is a pretty cool century. Just imagine what we'll accomplish in the next.

Heated Debate

Taking the temperature of the first warmblooded fish

The rotund, silvery opah looks less like a deep-sea predator than a Mylar balloon, with curved pectoral fins that flap like wings. Its chest muscles account for almost a fifth of its body mass and, cleverly marinated, can pass for beef. But biologists with the National Marine Fisheries Service have now discovered the oddball opah's most distinctive feature: It is the only fish known to be fully warmblooded.

"The coolest part—well, not cool in terms of temperature, but the neatest part—is that the opah has a warm heart," says Kenneth Goldman, an Alaska shark biologist. Scientists have long known that some fish, including select species of billfish, shark and tuna, are partially warmblooded. In 1835, British physician John Davy noted that a tuna's blood temperature was "much the same, or little less than the

blood of a pig." That was a bit of an overstatement. Most partially warmblooded fish stay just a few degrees above the surrounding water temperature. But that's enough to give them a predatory edge, relative to their "thermoconformist" peers.

Warmer fish can expand their range, in latitude and depth, and cruise faster because of increased red muscle output, benefits brought to an extreme in birds and mammals, whose stable body temperatures might have led to the development of complex central nervous systems. While mammals make metabolic heat even at rest, fish mostly keep warm through active movement. Thus the opah's juiced-up pecs.

Partial warmbloodedness has evolved several times in fish, and yet it's rare, found in less than 0.1 percent of fish species. It's tough to retain warmth in water, which is

far denser than air and sucks body heat, particularly where it meets blood for oxygen exchange. (One critique of the movie *Waterworld* is that a gilled Kevin Costner would have died of hypothermia.) Specialized blood vessel systems called *retia mirabilia*—"wonderful nets"—work like radiators to heat isolated organs. Some stomachs are warm for better digestion. And the opah is known to have warm eyes. But typically only a few organs benefit.

Not so in the opah. Nicholas Wegner, who has been tagging live opah and dissecting dead ones with his NMFS team, found the *retia mirabilia* embedded right in the opah's gill arches, meaning that heat circulates throughout the whole body. When a colleague, Owyn Snodgrass, checked core opah temperatures in living fish, they were uniformly warm.

Yet warmth does not equal invincibility. Sometimes a tagged opah's light sensor will go dark and its heat sensor will mysteriously warm, suggesting that a study animal has ended up inside the warm belly of a cold-hearted shark. —ABIGAIL TUCKER



Opah caught off the coast of Hawaii can weigh 200 pounds.

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Your Questions Answered by Our Experts

When spiders get sucked into a vacuum cleaner, can they eventually crawl back out, or do they suffocate in all that dust?

Pamela Wyatt, San Diego

Almost every spider sucked into a home vacuum cleaner will die—either immediately, from the trauma of ricocheting through the machine’s narrow tubes, or eventually, from thirst. Arachnologists collect living specimens with leaf blowers reversed to suck rather than blow, but the machines are modified to make the spiders’ landings less perilous. *Jonathan Coddington, curator of arachnids and myriapods, National Museum of Natural History*

“Pittsburgh” ends with an h, but not “Harrisburg.” Why? Patrick Ian, Philadelphia

Amid America’s rampant growth in the Gilded Age, the United States Board on Geographic Names and postal authorities tried to standardize place names. “Borough” became “boro,” and “centre,” “center.” Possessives were dropped (“Crary’s Mills” became “Crary Mills”). Towns ending in “-burgh” dropped the “h.” Thus Pittsburgh lost its “h”—but got it back, through forceful lobbying, in 1911. *Nancy Pope, curator, National Postal Museum*

Human ancestors originated in Africa, where skin color is dark. So why do other populations have lighter skin? **Norbert Stogniew, Sunnyvale, California**

The color of early modern humans in Africa had the benefit of protecting the skin against the sun’s rays—which can strip away folic acid, a nutrient essen-

tial to the development of healthy fetuses. Yet when a certain amount of UV rays penetrate the skin, they help the body use vitamin D to absorb the calcium necessary for strong bones. As people moved to areas farther from the Equator with lower UV levels, natural selection favored lighter skin, which allowed more UV rays to penetrate. *Rick Potts, paleoanthropologist, National Museum of Natural History*

For spiral galaxies to remain spirals, stars on the outside must travel around the center faster than stars closer in. Doesn’t this violate Newtonian gravity? **Mark Dormann, Palm Coast, Florida**

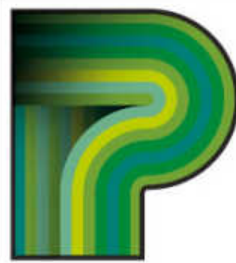
As they are understood today, those spiral structures are not “arms” of stars traveling around a core, but transient regions of increased gravity density. Higher gravity density enhances star formation, which is why those regions have more stars than others. Astronomers speculate on various causes for spiral-shaped gravity density

waves, but none of these would bring Newton’s laws into question. *David DeVorkin, curator of space history, National Air and Space Museum*

Which animals survived the Permian/Triassic extinction other than snails and sea urchins? **Bickley Simpson, New York City**

Among marine lineages, two major survivors were the mollusks and echinoderms (which include sea urchins, starfish and sea cucumbers). Here on land, the arthropods and vertebrates survived. *Conrad Labandeira, curator of fossil arthropods, National Museum of Natural History*

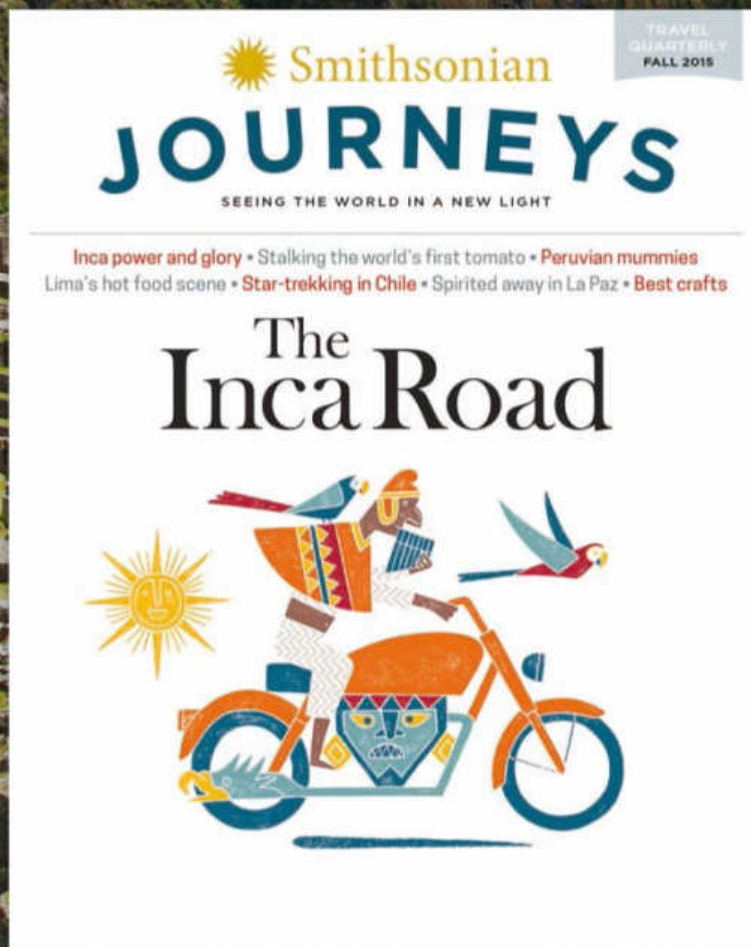
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Legend of the Green Monster

“The vine that ate the South” was never as scary as its billing—and now kudzu appears to be in retreat

A

s a young naturalist growing up in the Deep South, I feared kudzu. I'd walk an extra mile to avoid patches of it and the writhing knots of snakes that everyone said were breeding within. Though fascinated by the grape-scented flowers and the purple honey produced by visiting bees, I trembled at the monstrous green forms climbing telephone poles and trees on the edges of our roads and towns.

Introduced from Asia in the late 19th century as a garden novelty, but not widely planted until the 1930s, kudzu is now America's most infamous weed. In a few decades, a conspicuously Japanese name has come to sound like something straight from the mouth of the South, a natural com-

NATURE INVASION

plement to inscrutable words like Yazoo, gumbo and bayou.

Like most Southern children, I accepted, almost as a matter of faith, that kudzu grew a mile a minute and that its spread was unstoppable. I had no reason to doubt declarations that kudzu covered millions of acres, or that its rampant growth could consume a large American city each year. I believed, as many still do, that kudzu had eaten much of the South and would soon sink its teeth into the rest of the nation.

I'm not sure when I first began to doubt. Perhaps it was while I watched horses and cows mowing fields of kudzu down to brown stubs. As a botanist and horticulturist, I couldn't help but wonder why people thought kudzu was a unique threat when so many other vines grow just as fast in the warm, wet climate of the South. I found it odd that kudzu had become a global symbol for the dangers of invasive species, yet somehow



BY BILL FINCH

art by Laura Plageman



NATURE INVASION

rarely posed a serious threat to the rich Southern landscapes I was trying to protect as a conservationist.

Now that scientists at last are attaching real numbers to the threat of kudzu, it's becoming clear that most of what people think about kudzu is wrong. Its growth is not "sinister," as Willie Morris, the influential editor of *Harper's Magazine*, described in his many stories and memoirs about life in Yazoo City, Mississippi. The more I investigate, the more I recognize that kudzu's place in the popular imagination reveals as much about the power of American mythmaking, and the distorted way we see the natural world, as it does about the vine's threat to the countryside.

Kudzu might have forever remained an obscure front porch ornament had

Many historians believe it was the persuasive power of a popular radio host and *Atlanta Constitution* columnist named Channing Cope that finally got those seedlings in the ground. Cope wasn't just an advocate. He was, as cultural geographer Derek Alderman suggests, an evangelist. Cope spoke of kudzu in religious terms: Kudzu, he proclaimed on his Depression-era broadcasts, would make barren Southern farms "live again." There were hundreds of thousands of acres in the South "waiting for the healing touch of the miracle vine."

Railroad and highway developers, desperate for something to cover the steep and unstable gashes they were carving into the land, planted the seedlings far and wide. There were kudzu queens and regionwide kudzu planting contests. By the early 1940s, Cope had started the Kudzu Club of America, with a membership of 20,000 and a goal of planting eight million acres across the South.

By 1945, only a little more than a

generation of Southern writers largely ignored kudzu, its metaphorical attraction became irresistible by the early 1960s. In the often-cited poem "Kudzu," Georgia novelist James Dickey teases Southerners with their own tall tales, invoking an outrageous kudzu-smothered world where families close the windows at night to keep the invader out, where the writhing vines and their snakes are indistinguishable. "I thought the whole world would someday be covered by it, that it would grow as fast as Jack's beanstalk, and that every person on earth would have to live forever knee-deep in its leaves," Morris wrote in *Good Old Boy: A Delta Boyhood*.

For the generations of writers who followed, many no longer intimately connected to the land, kudzu served as a shorthand for describing the Southern landscape and experience, a ready way of identifying the place, the writer, the effort as genuinely Southern. A writer for *Deep South Magazine* recently gushed that kudzu is "the ultimate icon for the South...an amazing metaphor for just about every issue you can imagine within Southern Studies." One blogger, surveying the kudzu-littered literature of the modern South, dryly commented that all you have to do to become a Southern novelist is "throw in a few references to sweet tea and kudzu."

For many, the vivid depictions of kudzu had simply become the defining imagery of the landscape, just as palms might represent Florida or cactus Arizona. But for others, kudzu was a vine with a story to tell, symbolic of a strange hopelessness that had crept across the landscape, a lush and intemperate tangle the South would never escape. In a 1973 article about Mississippi, Alice Walker, author of *The Color Purple*, wrote that "racism is like that local creeping kudzu" ➔

Though sources continue to repeat the claim that kudzu is spreading at the rate of 150,000 acres a year, the Forest Service expects an increase of no more than 2,500 acres a year.

it not been given a boost by one of the most aggressive marketing campaigns in U.S. history.

In the decades that followed kudzu's formal introduction at the 1876 World's Fair Centennial Exhibition in Philadelphia, farmers found little use for a vine that could take years to establish, was nearly impossible to harvest and couldn't tolerate sustained grazing by horses or cattle. But in 1935, as dust storms damaged the prairies, Congress declared war on soil erosion and enlisted kudzu as a primary weapon. More than 70 million kudzu seedlings were grown in nurseries by the newly created Soil Conservation Service. To overcome the lingering suspicions of farmers, the service offered as much as \$8 per acre to anyone willing to plant the vine.

million acres had been planted, and much of it was quickly grazed out or plowed under after federal payments stopped. Farmers still couldn't find a way to make money from the crop. By the early 1950s, the Soil Conservation Service was quietly back-pedaling on its big kudzu push.

But the myth of kudzu had been firmly rooted. Those roadside plantings—isolated from grazing, impractical to manage, their shoots shimmying up the trunks of second-growth trees—looked like monsters. The miraculous vine that might have saved the South had become, in the eyes of many, a notorious vine bound to consume it.

Though William Faulkner, Eudora Welty and others in that first great

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NATURE INVASION

vine that swallows whole forests and abandoned houses; if you don't keep pulling up the roots it will grow back faster than you can destroy it." The photographs of kudzu-smothered cars and houses that show up repeatedly in documentaries of Southern life evoke intractable poverty and defeat.

Confronted by these bleak images, some Southerners began to wear their kudzu proudly, evidence of their invincible spirit. Some discovered a kind of perverse pleasure in its rank growth, as it promised to engulf the abandoned farms, houses and junkyards people couldn't bear to look at anymore. Now there's a cottage industry of kudzu-branded literary reviews and literary festivals, memoirs, cartoon strips and events. *Kudzu: A Southern Musical* toured the country. An endless proces-

and about one-sixth the size of Atlanta. That's about one-tenth of 1 percent of the South's 200 million acres of forest. By way of comparison, the same report estimates that Asian privet had invaded some 3.2 million acres—14 times kudzu's territory. Invasive roses had covered more than three times as much forestland as kudzu.

And though many sources continue to repeat the unsupported claim that kudzu is spreading at the rate of 150,000 acres a year—an area larger than most major American cities—the Forest Service expects an increase of no more than 2,500 acres a year.

Even existing stands of kudzu now exude the odor of their own demise, an acrid sweetness reminiscent of grape bubble gum and stink bug. The Japanese kudzu bug, first found in a garden near Atlanta's Hartsfield-Jackson International Airport six years ago, apparently hitched a plane ride and is now infesting vines throughout the South, sucking the plants' vital juices. In places where it was once relatively

Yet the popular myth won a modicum of scientific respectability. In 1998, Congress officially listed kudzu under the Federal Noxious Weed Act. Today, it frequently appears on popular top-ten lists of invasive species. The official hype has also led to various other questionable claims—that kudzu could be a valuable source of biofuel and that it has contributed substantially to ozone pollution.

The hype didn't come out of nowhere. Kudzu has appeared larger than life because it's most aggressive when planted along road cuts and railroad embankments—habitats that became front and center in the age of the automobile. As trees grew in the cleared lands near roadsides, kudzu rose with them. It appeared not to stop because there were no grazers to eat it back. But, in fact, it rarely penetrates deeply into a forest; it climbs well only in sunny areas on the forest edge and suffers in shade.

Still, along Southern roads, the blankets of untouched kudzu create famous spectacles. Bored children traveling rural highways insist their parents wake them when they near the green kudzu monsters stalking the roadside. "If you based it on what you saw on the road, you'd say, dang, this is everywhere," said Nancy Loewenstein, an invasive plants specialist with Auburn University. Though "not terribly worried" about the threat of kudzu, Loewenstein calls it "a good poster child" for the impact of invasive species precisely because it has been so visible to so many.

It was an invasive that grew best in the landscape modern Southerners were most familiar with—the roadsides framed in their car windows. It was conspicuous even at 65 miles per hour, reducing complex and indecipherable land- **CONTINUED ON PAGE 92**

E.O. Wilson, the Harvard naturalist, says the central Gulf Coast states "harbor the most diversity of any part of eastern North America, and probably any part of North America."

sion of "kudzu" cafés, coffeehouses, bakeries, bars and even seafood and sake houses are distributed across the South, many of them easily found on the Atlanta-based Kudzu.com search engine.

The *myth* of kudzu has indeed swallowed the South, but the actual vine's grip is far more tenuous.

In news media and scientific accounts and on some government websites, kudzu is typically said to cover seven million to nine million acres across the United States. But scientists reassessing kudzu's spread have found that it's nothing like that. In the latest careful sampling, the U.S. Forest Service reports that kudzu occupies, to some degree, about 227,000 acres of forestland, an area about the size of a small county

easy to get a photograph of kudzu, the bug-infested vines are so crippled they can't keep up with the other roadside weeds. A study of one site showed a one-third reduction in kudzu biomass in less than two years.

So where did the more fantastic claims of kudzu's spread come from? The widely cited nine-million-acre number appears to have been plucked from a small garden club publication, not exactly the kind of source you expect a federal agency or academic journal to rely on. Two popular how-to books, one a kudzu craft book and the other a "culinary and healing guide," are, strangely, among the most frequently quoted sources on the extent of kudzu's spread, even in scholarly accounts.



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The old standbys
are still great.
But here are

25

surprising new
destinations
to put on your
bucket list

SOME HUMANS ARE CONTENT WITH A

life well lived. Most of us, however, want hard evidence: the vacation photos, the souvenirs, the Hall of Fame plaque with the lifetime stats. Phoebe Snetsinger had her life list.

That's what birders call the summation of their years of devotion. Snetsinger had long been an enthusiastic birder, but when a doctor gave her a diagnosis of terminal cancer near her 50th birthday, she began traveling to ever more distant and daunting environments to

see *rarae aves*. Meanwhile, her disease went into remission. By the time she died, in 1999, at age 68, she had spotted a then-record

8,400 species, nearly 85 percent of the world's known winged creatures. Her achievement is an admittedly extreme example of what the life list has become in the broader culture: things to experience while you still have time.

Others, less delicately, prefer "bucket list," a term from the 2007 film in which Jack Nicholson and Morgan Freeman play stricken men who set out to do all the things they've wanted to do before kicking the bucket. The phrase is so handy it seems as if it has been around forever, but the screenwriter, Justin Zackham, says it just happened to be what he called an epic to-do list pinned to his bulletin board.

Life list, bucket list—the basic idea has been around ever since the fifth century B.C., when Herodotus' *History* sent Greeks eagerly across the Mediterranean to see Luxor and the pyramids. Nothing against those spectacles, mind you, but just since the dawn of this century, a whole roster of amazing sights has emerged, ready for the seeing. So get going: Phoebe Snetsinger didn't eyeball 8,400 bird species while sitting on the couch.

maps by
MICHAEL
HIRSHON

The LONGEST CAVE

HANG SON DOONG VIETNAM



Hang Son Doong, in Vietnam's Phong Nha-Ke Bang National

Park, has ceilings so high (600 feet) they could accommodate the Washington Monument. Its widest expanses (450 feet) could fit a pair of Boeing 747s side by side. A shimmering blue river runs through it. Most spectacularly, a jungle flourishes under shafts of sunlight in stretches where the ceiling fell in long ago. You want to go deep? The cave is more than five miles long—about five times longer than its nearest competitor for the world's longest, Deer Cave in Sarawak, Malaysia.

Hang Son Doong—the name means “mountain river cave”—has been open to visitors for only two years. (A tour operator says more people have summited Everest than traversed this underworld.) The cave entrance was discovered in 1991—and promptly lost. Ho Khanh, a local man then

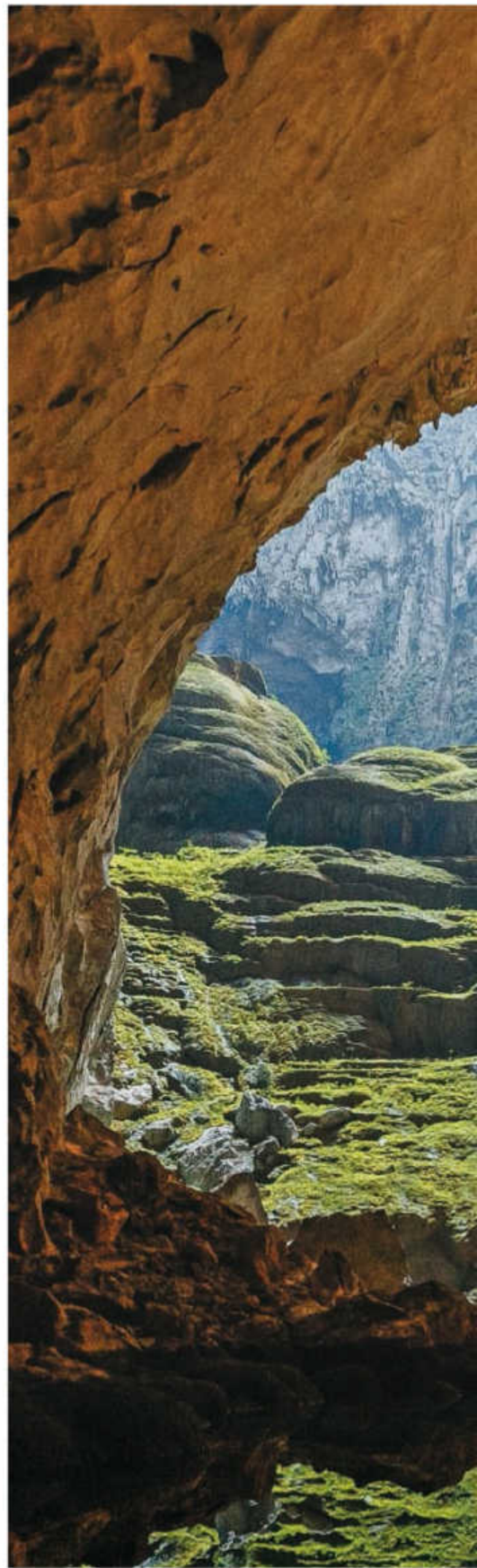
A shaft of sunlight hits a section of the cave, called Watch Out for Dinosaurs, daily around noon.

in his early 20s, went to the national park in search of aloe, whose resin he planned to sell to perfume makers. After he hiked a dozen fruitless miles, rain clouds gathered and Khanh took cover. “I sat down with my back to a

huge boulder, then something strange happened,” he later recalled. “I heard the sound of a strong wind and running water coming from behind me.” Back at his village, Khanh’s report of his thrilling discovery was met with skepticism, which only increased after he failed to find it again. He became a kind of semi-tragic figure—the young man who dreamed he’d found a giant cave.

Nearly 20 years later, a team of British cavers recruited Khanh to search for the legendary entrance. They made three expeditions, and found many caves, but not Khanh’s great pit. Finally, he returned to the jungle once more in 2009. “I stopped by a big boulder,” he said. “There was the same strong wind, the sound of water running—I knew I’d found the cave at long last.”

For more information, go to www.sondoongcave.org



RYAN DEBOODT





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compelling of those questions in 2012, when experiments first detected the formerly hypothetical Higgs boson and buttressed the Standard Model of particle physics.

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Virgin Galactic, a "spaceline" founded by the entrepreneur Richard Branson, has more than 400 people working in Mojave, California, to attain the objective. Though Branson acknowledged that he was shaken by the crash last October that killed a test pilot, he reaffirmed his commitment to "truly opening space." The plan is to take as many as six passengers at a time on a suborbital trip. Taking off from Spaceport America in New Mexico, the craft would rise to

about 361,000 feet, where you can see past the curved horizons and into the black edge of outer space. Then it would come straight down, offering a moment of weightlessness. More than 700 people have signed up, most recently at \$250,000 apiece. Meanwhile, two other companies, in Arizona and in Spain, may steal a bit of Branson's thunder by taking travelers to the edge of the stratosphere in high-performance balloons. Phileas Fogg would love it.

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GORILLAS *in* *their* MIDST

MOUNTAIN TREKKING EAST AFRICA



Most people who have seen gorillas have seen western lowland gorillas; nice creatures, but weighing in at just a few hundred pounds, they might as well be drinking from teacups and working on their macramé. They are not the majestic animals made famous by the intrepid zoologist Dian Fossey, the mountain gorillas that weigh nearly 500 pounds. To see them—and you might want to move it, since only 800 or so remain, and they are critically endangered by habitat loss—you have to go to the verdant heights of the Bwindi area of Uganda or the Virunga Mountains, which spread over parts of Uganda, Rwanda and Congo.

And thanks to *Gorillas in the Mist*, the Fossey biopic, and the 2014 Oscar-nominated documentary *Virunga*, gorilla tracking (or trekking) has become increasingly popular. But it is expensive and highly regulated. Permits are limited in number and range from \$400 per day in Congo to \$750 per day in Rwanda; visitors may spend no more than an hour with the animals. Beyond those precepts, the rules combine common sense and good manners: Speak quietly; stay at least 20 feet from the animals; if one charges, crouch down slowly, avoid eye contact and wait for the animal to pass. In other words, act as if you were taking your tween daughter to a One Direction concert.

A mountain gorilla family sticks together and stays on the lookout in Congo's Virunga National Park.

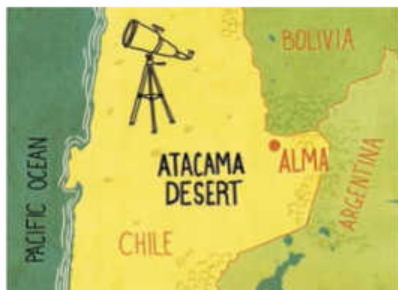
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ALMA TELESCOPE **CHILE**



If you like stars, head for the desert—Chile's Atacama

Desert. It's one of the world's driest places—scientists believe it received no significant rainfall between 1570 and 1971—and the absence of moisture offers the clearest view of the night sky on terra firma. That's why in 1999 European, Asian and North American nations partnered with Chile to create ALMA, or the Atacama Large Millimeter/submillimeter Array. Perched atop the Chajnantor Plateau at 16,570 feet above sea level, the observatory is one of the highest instruments on earth. ALMA's state-of-the-art telescope utilizes 66 radio antennas, most almost 40 feet in diameter, to create images comparable to those that could be obtained with a 46,000-foot-wide dish. It's been said that the scope could spot a golf ball nine miles away, but usually scientists use it to study ancient galaxies and to probe around young stars for nascent planets. That is, of course, a far better use of this equipment than investigating any of the half-dozen or so UFO sightings that have been reported in Chile since 2012. ALMA opened its control room and laboratories (but not the array itself, for safety reasons) to tourists this past March. So far, only earthlings have shown up. Or so they say.

For more information, go to www.almaobservatory.org

MORE *must* SEES

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Smithsonian.com/lifelist

HAVANA, CUBA

Time Capsule Go now—before the city preserved by trade sanctions disappears under LED billboards, new cars and cigar bans

LEICESTER, ENGLAND

Royal Treatment Trace Richard III's path from battle death to anonymous burial to rediscovery five centuries later

HAIFA, ISRAEL

Flower Power Stroll all 19 terraces of the gardens radiating from Mount Carmel at the main shrine of the Bahá'í faith

ROSS ISLAND, ANTARCTICA

Chill Out Layer up and celebrate New Year's Eve under the never-setting sun at the annual Icestock music festival

DELHI, INDIA

Throbbing Temple Behold the 20,000 hand-carved statues—and the robotics—at the Akshardham Temple

DUNBAR, SCOTLAND

For Peat's Sake Hike the new John Muir Way, between Dunbar (where the naturalist was born) and Gare Loch

KARAKUM DESERT, TURKMENISTAN

Hell, Yes Bask in the glow of the so-called Door to Hell—a cratered gas wellhead that's been flaming for decades

HUNAN PROVINCE, CHINA

Eyes Up Enter the Gates of Heaven, in Zhangjiajie National Forest Park, and trod the glass-floored, 4,700-foot-high skywalk

QUITO, ECUADOR

New Berths Board the refurbished Tren Crucero for a deluxe train ride through one of the most biodiverse places on earth

ELLIS ISLAND, NEW YORK

Past Perfected See the artist JR's reimagining of vintage photographs animate the reopened hospital building



The **INCREDIBLE** **SHRINKING** *Glacier*

MENDENHALL ICE CAVES **ALASKA**

On the rocks under Mendenhall Glacier: Expert guidance is recommended for the journey there.

Just 12 miles from downtown Juneau, in the Tongass National Forest, is the 12-mile-long Mendenhall Glacier, which began forming about 3,000 years ago and stopped growing in the mid-1700s. Now it's melting away, leaving ever less time to see one of the most breathtaking visions available. The glacier is partially hollow; melting reveals astonishing ice caves where blue water runs over blue rocks, creating surreal lava-lampish images. To see them, however, a visitor must kayak or otherwise boat through icy water to the glacier or clamber across the dangerous peninsula that protrudes into Mendenhall Lake. (When state troopers say the caves



and their approaches are the “most-rescued” area of the Tongass, they’re referring to people, not the landscape.) The roof of a popular cave partially collapsed in summer 2014; what remains is unstable. Park authorities strongly suggest hiring a guide; two companies lead expeditions to the glacier.

For more information, go to www.fs.usda.gov/detail/tongass/about-forest/offices/?cid=stelprdb5401454



FUTURE LIST

Start planning for these coming attractions:

MIAMI, FLORIDA

SkyRise Miami, a 1,000-foot tower shaped like a money clip, will offer simulated BASE jumping.

Tentative opening: 2018

ABU DHABI, UNITED ARAB EMIRATES

The Louvre Abu Dhabi will be the first of three museums in the new Saadiyat Island cultural district.

Tentative opening: December 2015

LONDON, ENGLAND

The world's most expensive footbridge—a public garden 1,200 feet long—will span the Thames.

Tentative opening: 2018

JEDDAH, SAUDI ARABIA

At 3,034 feet, Kingdom Tower will be the world's newest tallest building by hundreds of feet.

Tentative opening: 2018

GIZA PLATEAU, EGYPT

The Grand Egyptian Museum: 100,000 artifacts highlighting 7,000 years of civilization on the Nile.

Tentative opening: 2018



The FASTEST ROLLER COASTER

FERRARI WORLD ABU DHABI

You might have thought Ferrari World would be found in the Emilia-Romagna region of Northern Italy—perhaps in Modena, where the brilliant Enzo Ferrari was born, or in Maranello, where he moved his factory and race car operations during World War II. But no. Ferrari World, the planet's largest indoor theme park, opened in 2010 in Abu Dhabi. And in Ferrari World you will find Formula Rossa, the world's

fastest roller coaster. It uses a hydraulic launch system similar to the catapults used on aircraft carriers, and it goes from 0 to 60 miles per hour in two seconds and to its top speed of 149 mph in five. (The previous record holder, Kingda Ka of Six Flags Great Escape, in New Jersey, topped out at 128.) In keeping with the Formula One theme, passengers are required to wear goggles. Alberto Minetti, a professor of physiology in Milan, says that at 150 mph, "even dust that is not normally harmful is. Even dust like when you are sitting at your desk, it's like a bullet in a way."

For more information, go to www.ferrariworldabudhabi.com





The DEEPEST DIVE

CAYMAN TRENCH CARIBBEAN SEA

You may be one of those for whom a vacation isn't a vacation unless it offers a dip in the ocean. If so, you might consider the Roatan Institute of Deep-sea Exploration, or RIDE, a Honduras-based outfit that offers to take tourists as deep as 2,000 feet below the surface of the Caribbean. The owner and operator of RIDE, Karl Stanley, has been in business since 1998, but in the early 2000s he designed and built a small submarine called the *Idabel*, capable of deep dives. Stanley and his vessel today offer several experiences in the Cayman Trench, the deepest part of the

Caribbean; they vary in length and fee, starting with a 90-minute, 1,000-foot dive that costs \$500 and offers a close view of sea lilies, glass sponges, pompom anemones and lace coral. For those who do nothing halfway, RIDE offers a \$1,500 trip that guarantees a close view of sixgill sharks, among the largest but least-known predators in the sea. Their appearance is assured by the attachment of meat carcasses to the *Idabel's* exterior. The submarine descends below 1,500 feet into total darkness and waits for the sharks to appear, jostling the vessel as they enjoy their buffet and providing a signal to turn on the sub's exterior lights. This trip can last up to nine hours. Voyages on the *Idabel* are designed for two people and a pilot, but any combination of humanity that weighs less than 460 pounds can be accommodated. The record, says Captain Stanley, is six.

For more information, go to www.stanleysubmarines.com



The MECCA of ISLAMIC ART

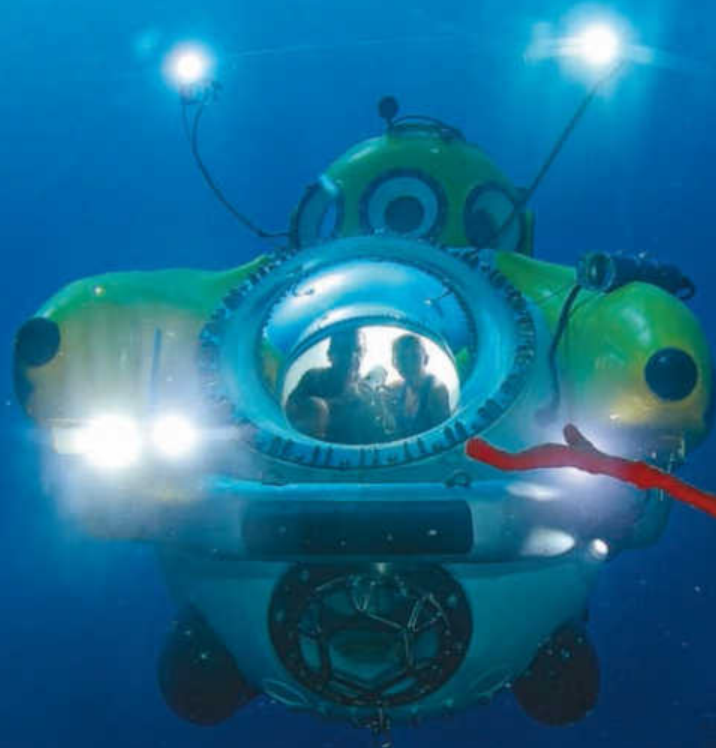
MUSEUM OF ISLAMIC ART QATAR



Fourteen hundred years in the making, the world's greatest collection of Islamic art—textiles, manuscripts, metalwork, woodwork, ceramics, jewelry and glass—is housed at the Museum of Islamic Art in Doha, Qatar. Designed by I.M. Pei after his immersive study of the life of Muhammad and the architecture of Islamic nations, the museum was described as his last major cultural building. (He was 91 when it opened, in 2008.) Concerned about how future construction in a rapidly growing city would affect the way the building is perceived—no architect wants to build a museum and then have a Dunkin' Donuts come along and photobomb his masterpiece—Pei had a word with Qatar's emir, Sheik Hamad bin Khalifa al-Thani. The sheik, who is also chairman of the museum's board, responded by building an island in the Persian Gulf just off Doha's new waterfront corniche to serve as

an unobstructed pedestal for the museum and its astonishing collection. Assembled over 20 years from sources in Spain, Egypt, Iran, Iraq, Turkey, India and Central Asia, it covers religious and secular concerns, including geometry, science and calligraphy. Take special care to see the bronze Andalusian fountainhead in the form of a doe and the calligraphy and illuminations in an extraordinary copy of the *Dala'il al-Khayrat* prayer book from Istanbul dating from 1216.

For more information, go to www.mia.org.qa/en



Under the sea
with the *Idabel*:
sea lilies, glass
sponges, pompom
anemones and
sixgill sharks.



The **GREATEST RESTAURANT**

NOMA **DENMARK**

Noma's baked apple with caviar, garnished with pillow moss and red seaweed.

Almost anything can be the world's best something for a moment. When something has been deemed the world's best four times in the last six years (with a plummet to second and third places in the Years We Don't Discuss), it commands attention. Located in a waterfront warehouse in Copenhagen, Noma—a mashup of the Danish words *nordisk* (“Nordic”) and *mad* (“food”)—is co-owned by chef René Redzepi and dedicated to serving a pure and inventive Nordic cuisine. Dinner comprises perhaps 20 small courses, each based on ingredients foraged from nearby forests, fields and seacoasts. Past dishes include fried reindeer moss and mushrooms; blue mussels and celery; caramelized



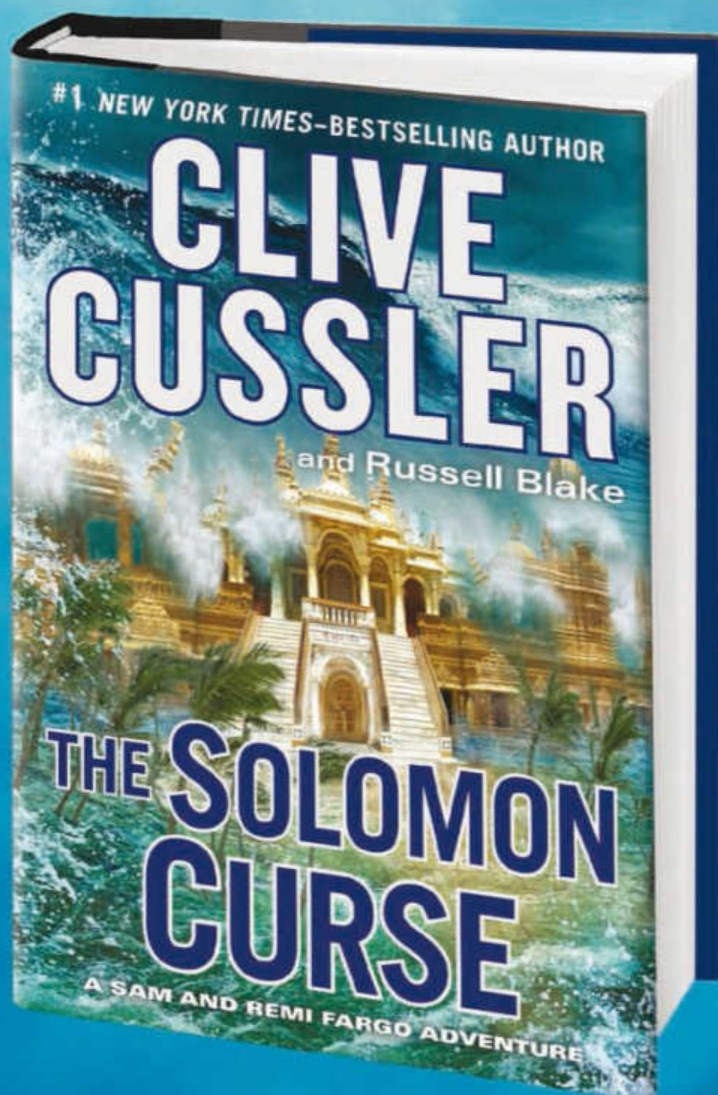
milk and cod liver; pickled quail eggs; radish, grass and—no kidding—simulated soil; preserved fish pancakes; sea urchin with dill and cucumber; and a dessert of carrot and sea buckthorn. If the dishes seem extraordinary, the way they appear on the plate is so out of this world that set designers for future *Star Wars* movies should study them for inspiration.

For more information, go to www.noma.dk

THE OUTSTANDING NEW FARGO ADVENTURE FROM #1 *NEW YORK TIMES*—BESTSELLING AUTHOR

CLIVE CUSSLER

THE GRAND MASTER OF ADVENTURE



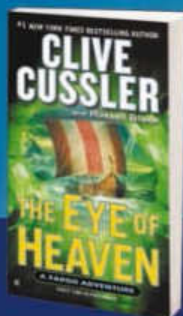
Whispers of an ancient curse lead husband-and-wife team Sam and Remi Fargo on a hunt from the Solomons to Australia to Japan, and what they find is like nothing they have ever seen before.

"ANOTHER RIVETING THRILLER. . . .
Fasten your seat belt for this wonderful read!"
—*Library Journal*

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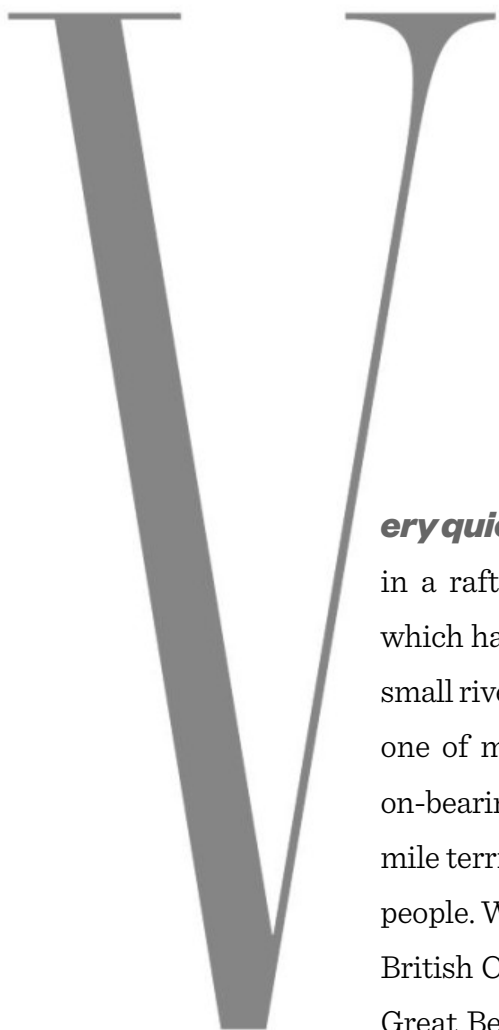
A white Kermode bear is shown in profile, standing on dark, wet rocks. The bear's fur is a pale cream color, contrasting sharply with the dark, mossy rocks and the dense, green forest in the background. The lighting is soft, highlighting the texture of the bear's fur and the wet surfaces of the rocks.

THE SPIRIT BEAR

*The white Kermode bear, a rare *ursa* sacred to local tribes, is now the center of a fierce battle to protect British Columbia's rainforest*

BY ALEX SHOUMATOFF / PHOTOGRAPHS BY MELISSA GROO





ery quietly we paddle to shore

in a raft from the research vessel, which has stopped at the mouth of a small river cascading into the Pacific, one of more than a hundred salmon-bearing rivers in the 1,500-square-mile territory of the Kitasoo/Xai'xais people. We're halfway up the coast of British Columbia, in the heart of the Great Bear Rainforest, in one of the

largest unspoiled temperate rainforests on earth. We climb out and sit on boulders in the intertidal zone, in front of a meadow. Behind it is primeval forest, a solid wall of trees—western red cedar, Sitka spruce, alder, hemlock, Douglas fir.

A crow let out two clarion caws as we came in, and now every animal within earshot knows of our arrival. The humans are back. Four of us have mounted serious lenses on tripods, and we are all waiting motionlessly, respectfully. Big gobs of meringuelike foam drift down the final run of the river into the seething surf. “Organic matter,” whispers our guide, Philip Charles, a 26-year-old Brit who has a bachelor's degree in animal conservation science and has been made an honorary Kitasoo for all the work he has done to help these First

Nations people reassert sovereignty over their homeland, and to get ecotourism going.

The Kitasoo merged with the Xai'xais during the second half of the 1800s and founded the community of Klemtu, on Swindle Island, on the Inside Passage from Vancouver to Alaska. The main trade item along the coast was eulachon, an oily smelt whose flesh was a food staple and whose oil was used as a medicine and for illumination. By the end of the 20th century, though, there weren't enough eulachon to sustain a market. Today, many of the more than 300 Kitasoo/Xai'xais living here rely on ecotourism.

After 20 minutes, Charles points to a luminous white bear, maybe 300 pounds, which has come out of the dark forest on the other side of the river, some 200 feet upstream. She slips gently down into a pool fed by water gushing over a ledge. Within a few minutes, she bats a salmon into her mouth and ambles with it back into the forest.

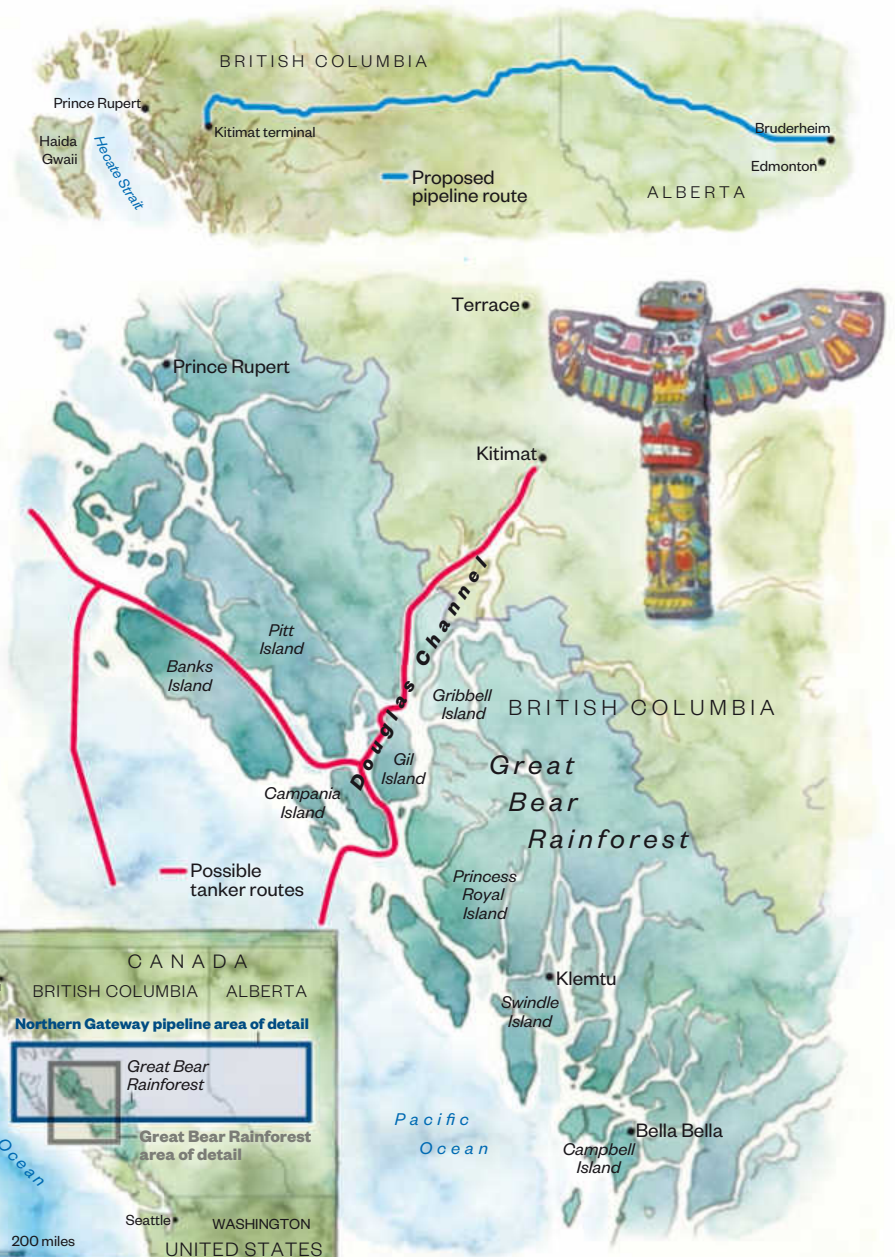
The white bear is known to the Kitasoo as the *Moksgm'ol*, the spirit, or ghost, bear. The Kitasoo have been living on these coastal islands and fjord-diced tongues of mainland for thousands of years. They revere every living thing, but the *Moksgm'ol* is especially sacred. It is one of the rarest bears on earth. There are as few as 100, according to some estimates. Scientifically, the white ones, along with their closest black relatives, belong to a subspecies of black bear: the Kermode bear,

“NO ONE REALLY KNOWS HOW MANY BEARS THERE ARE IN THE GREAT BEAR RAINFOREST.”

Ursus americanus kermodei, named in 1905 for Francis Kermode, who helped zoologists find the bears and later became the director of the Royal British Columbia Museum in Victoria. Geneticists have since learned that the coloration results from a mutation in a gene involved in the production of melanin. (It's not one of the four genes responsible for albinism.) The trait is recessive: Both parents must carry a copy of the mutated gene for their offspring to be white. In the Great Bear Rainforest, some 500 to 1,200 black bears might be carriers.

But “no one really knows how many bears there are in the Great Bear Rainforest,” cautions Chris Darimont, the Hakai-Raincoast professor of geography at the University of Victoria, who is partnering with the Kitasoo/Xai'xais and other First Nations, including the Heiltsuk, down the coast, in the first on-the-ground research incorporating indigenous knowledge and customs in the study of the rainforest's bears.

The largest concentration of white bears, an estimated 7 out of a population of 35, inhabits 80-square-mile Gribbell Island, in the territory of the Gitga'a't, the next nation up the coast. The greatest number, maybe 50 or 60, is on Princess Royal Island, adjacent to Gribbell and ten times larger. And there are frequent sightings around Terrace, on the mainland to



illustrated map by **STEVE STANKIEWICZ**

the north. In 2014, guides at the Spirit Bear Lodge, in Klemtu, saw eight, the most since the lodge had opened six years earlier.

This bear at the river, a female that has a cub, was first spotted two and a half weeks ago. There are no other bears here, no competition, no males to kill her cub—which they sometimes do to get the female back into estrus. Charles says he has returned with guests from the lodge eight times, and only once did mother and cub not appear. Yesterday she left the cub alone with Charles and his party for ten minutes, as if she wanted the cub to learn that people are not so bad after all. They have obviously never encountered a hunter, the greatest immediate threat to bears (black and grizzlies) in the Great Bear Rainforest, where more than two dozen a year are killed by hunters authorized by British Columbia's Ministry of Forests, Lands and Natural Resource Operations. It is illegal to hunt a white bear under any circumstance, but a hunter with a permit could take a black bear carrying the gene.

Charles says the cub is a male in its first year of life. It's October now. Next spring, when the bears leave their den, his mother will boot him out into the world and he'll be on his own.

After a minute or so mom re-emerges from the woods without the salmon,

the salmon into the forest, where the rotting carcasses, rich in nitrogen, fertilize the soil. The nitrogen permeates the trees and the flowering plants; even the snails and slugs get it. The sea feeds the forest, and the bears are the bearers of these nutritious infusions.

Each of the spawning rivers in the Kitasoo/Xai'xais territory has its own salmon population, born in the river and guided by the river's unique olfactory signature; the fish return to spawn after years of wandering in the North Pacific. Each river is on its own schedule, with four of the seven Pacific species—sock-eye, coho, pink and chum—running up the same river at different times. Climate change, though, is threatening these runs by warming up the waters, and thus threatening the bears that fatten up on the salmon to get through the winter. Overfishing is also a problem here.

The pink salmon that we watch the mother bear devour are already dead. Having spawned and expired upstream, they have floated down. "Yesterday she caught two live ones," Charles tells us. "Some bears fish fast; they catch 20 salmon in 20 minutes and devour them immediately. Others are really picky and will only eat the brain and eggs. There is a huge range in the personalities of individual bears, just like us."

Her cub comes out of the woods and joins in the feast. He has a reddish col-

SHE IS A CELEBRITY, AN OFFICIAL ANIMAL OF BRITISH COLUMBIA, AND THE PANDA OF CANADA.

slips back into the pool and catches another one. She sits on some rocks and tears its flesh apart and devours it.

The diet of all the bears here, and of the local wolves, is primarily salmon, berries and seaweed. The native people eat these same foods, along with deer and halibut, mussels and sea urchin. Salmon, though, is the sine qua non of this ecosystem. Bears carry

lar and his white coat is shaded brownish here and there, unlike his mother's. We debate in whispers whether this is juvenile coloration and the cub will get whiter with age, whether his coat is an imperfect expression of the mutation, or whether it's just dirty.

The mutation probably rose to prominence during the last ice age, hypothesizes Kermit Ritland, a popu-

lation geneticist at the University of British Columbia who led the study that identified it. Glaciers then covered most of the Pacific Northwest. Perhaps a black bear population was cut off on a strip along the coast, and inbreeding increased the mutation's frequency and its odds of meeting up with itself. Later, as the glaciers melted and the sea rose, some of the bears might have been stranded on these islands while others traveled back to the mainland.

Researchers have recently discovered that white bears attempting to capture salmon are 30 percent more successful than black bears during the daytime, presumably because, from the perspective of fish in the river, the white bears are less visible against the





sky, like the white-bellied Bonaparte's gulls and glaucous-winged gulls that are plentiful in the area. Part of this study involved researchers dressing up in white or black coveralls and entering the river to see which outfit spooked the salmon less.

So the white forms seem to have a slight edge in the quest for protein, but not enough for their mutated gene to have more than a 10 to 30 percent frequency. Why the white coloration persists in the population remains something of a puzzle, and scientists don't yet know whether it comes with any other ecological consequences.

The mom and cub cross the river, which is only 30 feet wide, and go down into another pool behind some

The Kitasoo and Xai'xais have long used Klemtu as a seasonal camp. Today, aquaculture is the primary industry.

rocks, which the mother climbs up and peers over, now only 50 feet away. With only her head visible, she studies us intently, drinks us in and sniffs us out with her ash-colored nose, the way elephants do with their trunks. A bear's sense of smell is ten times stronger than a dog's, which is 1,000 times stronger than a human's, and it is the main sense used during the day, a Kitasoo guide told me.

The mom decides not to come any closer, and she and the cub slip into the woods. I wonder what she makes of the brace of cameras clicking away, of all

the attention she is getting, like a celebrity at a photo op. She *is* a celebrity, an official animal of British Columbia, and the panda of Canada. That's what the spirit bear has been called by the environmental groups that enlisted it in the battle to protect the Great Bear Rainforest, which began in the 1990s and is still going on. At this point, about a third of the Great Bear Rainforest is fully protected, and not all of the First Nations have signed off on the most recent agreement proposed by a coalition of environmental groups and adopted by the provincial government.

With a new threat to the ecosystem posed by the proposed Enbridge Northern Gateway pipeline, which would bring crude oil extracted from



A study in 2002 found that bears take salmon up to 700 feet into the forest. Elsewhere, nitrogen from salmon feeds plants 3,000 feet from streams.



the Alberta tar sands to the town of Kitimat, up the coast, the bear's services as a charismatic animal, good for raising funds and rallying people to the cause, are required again. The Natural Resources Defense Council, for instance, has recruited the bear in its new campaign to "Save the Spirit Bear Coast" and stop the pipeline. If it were constructed, tankers would have to navigate the narrow, rocky, 100-mile-long Douglas Channel, and a spill could be catastrophic.

The Moksgm'ol is also a cash cow, for

ing is no ordinary bear, and that we too have had a brief encounter with a very special being. We all high-five.

During the five and a half hours we hang out with the bears, we have plenty of time to take in the majesty of our surroundings. The crow in the alder is watching for salmon eggs washed out of nests to float down the river, as are the gulls and dippers on the river's banks, and a juvenile eagle sits in the hemlock, his father keeping an eye on him from a nearby perch. Bobbing out



the Spirit Bear Lodge and the other tour operators that take visitors to the islands and fjords where it lives. The bear, like the white buffalo of the American plains, is traditionally seen as a giver of good luck and power to those it appears to. One showed up when the Kitasoo/Xai'xais were building a new Big House in Klemtu in 2002. This was the first one built since the early 1900s, because missionaries and governments, after arriving in the late 19th century, had banned the ceremonies, dances and other cultural practices that took place in there. The spirit bear's arrival was seen as propitious. It hung around for a few days, and then disappeared as mysteriously as it had come.

All of us by the river agree that the patient female we have been observ-





"I didn't believe they existed because my community never talked about them," says Doug Neasloss (left), of the spirit bear. With Krista Duncan and other local people, he is now active in bear research.

in the surf are red phalaropes and, a first for me, a marbled murrelet, which, along with the also-threatened northern spotted owl, was used to combat the logging of California's old-growth coastal forests. Out in the channel behind the research vessel, five humpback whales are spouting geysers as high as trees. They are bubble feeding, creating a net of air bubbles through which they will swim up from below with their mouths open and gobble up the disoriented krill.

Behind the forest that lines the sea, hidden from view, huge granite domes

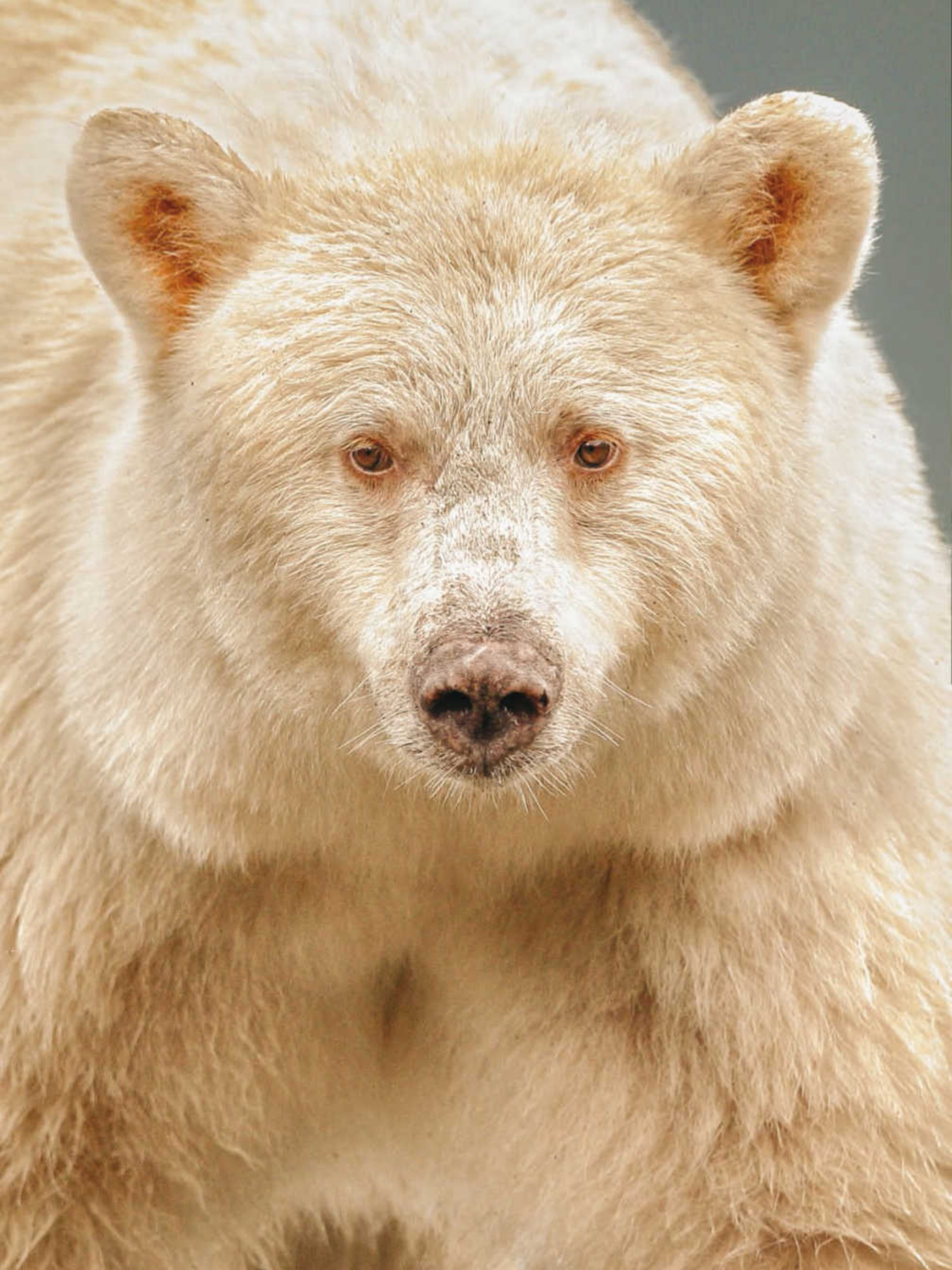
rise up to 5,000 feet. Some have waterfalls spurting down their sheer walls from higher, snow-fed lakes. Philip Charles says there are white mountain goats on the summits. In winter, when the shoreline is white with snow, the goats sometimes come down to feed on seaweed and mussels.

I have been, along with another of the bear watchers here, Melissa Groo, to many of the world's Edens, including the *bai*, the clearing in the rainforest of the Central African Republic, where hundreds of forest elephants come out and carry on most of their social life. But this one is especially magical, even mystical. Not only because of the bears—and their gentle, nurturing side that we are witnessing—but because the whole ecosystem, swarming with

life on land and sea, puts being alive into a perspective much different from our modern urban one. We are at one with all that surrounds us. We breathe the same air; we are all of a piece.

As my grandmother whispered to me on her deathbed, we are all transitional characters.

The Kitasoo have many stories about shape-shifting, with animals taking human form and vice versa. The greatest shape-shifter is the sea otter. Bears are regarded as particularly close to humans; if you take off the fur, bears become people. In one story, a woman is kidnapped by and marries a handsome man who is actually a bear, and they have three kids, with human faces and bear bodies. One of the kids is the color of snow





because of a deal that Raven, a trickster and Creator of everything, had made with the black bears long ago. After turning himself into a child to learn how to make fire, Raven, then white, flew out through a hut's smoke hole, singeing his wings and covering them with soot. He remained black for the rest of time, but he convinced the bears to agree that some of their cubs would be white.

In another story, told to the Canadian poet Lorna Crozier, people and animals could once talk to each other. The first bear to meet a human taught the human what plants to eat and how to catch salmon. The bear was about to teach the human all about hibernation, when another human came along and killed it with an arrow. This is why, the Kitasoo say, people have to collect food and firewood to make it through the winter, instead of sleeping through its cold, dark months.

In 2007 the provincial and federal governments, along with nongovernmental organizations, raised \$120 million for a trust made available to the 27 nations in the Great Bear Rainforest, to use for the stewardship of the land and the well-being of the people. The Kitasoo/Xai'xais opted to use some of the money for ecotourism, and opened the Spirit Bear Lodge in 2008. Its success depends not only on the spirit bear, but also on the coastal black bears and the grizzlies, which also attract tourists and keep the ecosystem healthy. Doug Neasloss, 33, a member of the Raven (crest) clan, was a guide for Spirit Bear Lodge until he became chief councilor of Klemtu, a position he held until 2013. His first summer as a guide, he was returning to the lodge after viewing grizzlies with some clients when he passed a boat full of men who didn't look like tourists. "I didn't have a good feeling, and the next day I returned to

The mutation that gives some Kermode bears a white coat is on the same gene responsible for the coloration of golden Labrador retrievers. Both parents must carry the variant for a cub to be white.

where we watched the bears, and there was one that had been decapitated, skinned and its paws cut off." Trophy hunters. There are also poachers only interested in selling bear livers to the lucrative Chinese market.

Neasloss' concern about the bears brought him into contact with Chris Darimont, who was studying coastal wolves and occasionally came upon the remains of bears that had been killed by hunters. Darimont was the science director of an NGO called Raincoast Conservation Foundation, which raised \$1.3 million to buy the hunting concession to an area in the Kitasoo/Xai'xais territory and beyond that was particularly thick with grizzlies. By owning the license, Raincoast

prevents hunters from being able to shoot the bears there. In 2012, nine nations belonging to what is called the Great Bear Initiative voted to ban *all* bear hunting in their traditional territories, but the provincial government is still issuing licenses there. Darimont and Neasloss realized that the first step in protecting both grizzlies and black bears, including the white ones, was to collect baseline data about their numbers, movements, relatedness and behavior. William Housty, one of the Heiltsuk's progressive young leaders, had reached the same conclusion. Housty, who has a degree in natural resource management, knew about a passive hair snag that others had used with success in the interior. It consists of a square of barbed wire maybe eight feet long on each side and a foot and a half off the ground, with a stack of sticks and moss in the middle that reek of fish. Suspended eight feet above, there's an aluminum pie plate containing a cloth soaked with vanilla, loganberry or orange anise extract or beaver anal mucus, scents that any bear in the vicinity will pick up from miles away. As the bear steps over the barbed wire, some of its arm, belly or leg hair is caught in some of the tines, which it doesn't even notice. And when the bear comes by the trap, night or day, infrared video



THERE IS A KITASOO EXPRESSION: WHEN THE TIDE IS OUT, THE TABLE IS SET.

cameras fixed to nearby trees start recording. Last spring traps were set at the mouths of 70 of Kitasoo/Xai'xais' salmon-bearing rivers.

I spend a day with Neasloss and 28-year-old Krista Duncan, who collects the hair and video footage from the traps and rebaits them. The material is sent to a lab at the University of Victoria, where the DNA is extracted,

along with other information, and matched up with the video. This non-invasive method of data-gathering, as opposed to darting and radio-collaring, is in keeping with the deep respect the coastal people have for the bears.

"We scientists are just beginning to catch up with the wealth of traditional and local ecological knowledge on the rainforest coast, which is what

makes this collaboration so exciting," Darimont says.

What the hair-trap data are showing so far is that the grizzlies are on the move, probably looking for rivers with more salmon, Neasloss and Darimont think. Some grizzlies are swimming out to the islands where the white bears are. When a grizzly appears on a river where black bears are feeding on salmon, the island bears, white ones included, bolt into the forest. The white and black bears probably won't leave the islands entirely, Darimont says, but "they might eat less salmon, which is not great. Or they might switch to increased nocturnal foraging."

We visit a bear trap that has been set up on the edge of a lake created by



Grizzlies are “bullies” at the stream, says Chris Darimont. Scientists are studying how their behavior affects black bears.

an artificial dam. Gold miners lived here until the 1940s, when the mine was shut down. In 2003 a logging company moved in, clear-cutting the slopes and loading the logs on ships, and then leaving everything behind, apparently in great haste: trailers, 20 fuel barrels still full, a pickup truck with the key in the ignition, a big rusting Caterpillar, even a daily logbook, which Neasloss finds in one of the trailers and takes. He is hopping mad about this toxic mess.

Near the trailers, in a patch of Labrador tea, is the hair trap, with two

balls of fresh white fur on adjacent tines. A new white bear. There was no sign of it when Duncan checked the trap two weeks earlier. This is the sixth white bear whose hair she has found this year. She puts on blue plastic gloves and removes the hair with tweezers and puts it into a small yellow envelope and Ziploc bag. Then she burns the tines with a small blowtorch so no hair residue will mix with the next samples.

The next trap has been flooded by high tide and has black bear hair. It is on the edge of a forest of ancient red cedars, some thousand years old, Neasloss tells me. They have old man's beard moss hanging from their lower branches, an epiphytic licorice fern

that is thousands of times sweeter than sugar. He cuts me a slice of its stem to bite into and shows me a western yew tree, one of the hardest trees in the forest, from which bows and arrows were made.

The root system of one of the cedars has been hollowed out into a den, in which Neasloss finds black bear hair. One of the tree's buttresses has been chopped long ago by what he recognizes was a nephrite ax, the green jade axes that the coastal people used until 1846, when they adopted steel axes. The nephrite came from two locations in what is now Washington State and was traded up and down the coast. Someone probably chopped out enough of the tree's buttress to make a mask.

We visit Jess Housty, William Housty's 28-year-old sister, in Bella Bella, the capital of the Heiltsuk nation, on Campbell Island, southeast of Klemtu. She too is involved in the struggle to regain indigenous British Columbians' sovereignty over their own territories and is a powerful speaker. She has described the coast as vital “on a deeply intimate and personal level because it's the place where my ancestors' bones are buried. It's the place that's in my veins, that's imprinted in my DNA. . . . There's no other geography in the world where I make sense.”

She is working with Neasloss on fighting the Northern Gateway pipeline. Her strategy is to get the coastal nations' customary marine territory—not only their land but also the sections of sea they have fished for centuries—recognized as such, which would give them control over who could come in and out. They could then stop the nonnative fishermen who are taking so many salmon out of the rivers, and prevent the tankers from using Douglas Channel.

She tells me that the Heiltsuk, like the Kitasoo, believe there is no distinction between the land and the water. “Every land animal has a supernatural sea counterpart. There are sea bears who are the counterparts of the grizzlies and

CONTINUED ON PAGE 94

Broken Promise

Remembering how Hurricane Katrina shattered a city's faith

How mind-boggling to think that so much Hurricane Katrina history is contained in a ribbed fragment of concrete. I was a Tulane University history professor that August of 2005, when the hurricane hit town and dozens of levees were overrun. Contemplating this section of breached flood wall ten years later—it's from the London Avenue Canal—I'm astonished to remember that I thought this frail barrier could protect below-sea-level New Orleans neighborhoods from the Big One.

My flawed reasoning was that if the Netherlands had reclaimed miles from the North Sea since the devastating 1953 flood, then surely the nation that put Neil Armstrong on the moon had constructed a similarly reliable Dutch tool-kit of dikes, levees, pump houses and flood walls to protect the ragged-boot heel of Louisiana. I fully believed in the U.S. Army Corps of Engineers; after all, its reliance on lessons learned from Hurricane Betsy in 1965 and old-fashioned American

can-doism meant New Orleans was securely fortified. That the federally funded flood walls looked unsafe and poorly constructed never concerned me, because in America we built structures—think Hoover Dam—the right way. It was my conceit that New Orleans, a city with enormous cultural richness, the greatest port on the nation's greatest river, was safe.

While it seems perverse in retrospect, my love of New Orleans, a faith in its specialness, convinced me not to evacuate back in late August 2005, even though the Weather Channel showed a blob of fearsome dimension brewing in the Gulf of Mexico.

Abandoning my house in the Garden District, my wife and I made a vertical evacuation with our kids to the 15th-floor condominium of my in-laws at One River Place, near the French Quarter. As the storm arrived, I watched the white-capped Mississippi roaring backward and high winds blow apart the huge riverfront warehouse where Mardi Gras floats were stored.

Once the winds died, I went on an inspection tour of the French Quarter. My gut verdict was that structural damage aside, my city had survived the 130-mile-per-hour winds. But that upbeat assessment soon dissi-

pated as I wandered toward the Bywater neighborhood. A contingent of city police, nervously huddling, looked panic-stricken. They told me that the Industrial Canal had breached, that disaster was upon us, that the Big Easy would soon be flooded. "Get out of here," they commanded. "Fast!"

Indeed, Katrina became the most expensive natural disaster in U.S. history. The city's flood walls were exposed as ugly monuments to shoddy engineering. Once they cracked open, a monstrous spell engulfed New Orleans. Brutal displacement permeated every district. At night, with no electrical power, a grim eeriness held court. Before long, water was up to the eaves of half the city's houses. Panic swept through neighborhoods like a prairie fire. Storm survivors worried about walls of water, "toxic soup"-flooded streets, wrecked homes, police abandoning their posts, looting and larceny.

Not all was gloom. Brave first-responders risked their lives to save others. As 80 percent of New Orleans started filling up with water, ordinary citizens turned into superheroes. Yachts, dinghies, canoes, rafts, sailboats, scows and skiffs—even a floating wagon—became emergency ambulances, used to rescue people trapped in the flood zone. Putting their own lives on the line, these "homeboys" made the nation proud. With FEMA absent and the Louisiana National

by Douglas Brinkley





FROM THE
SMITHSONIAN
NATIONAL MUSEUM
OF AMERICAN
HISTORY

Guard having lost its equipment at the flooded Jackson Barracks, everyday Louisianans stepped up and saved fellow Louisianans. There was no magic U.S. cavalry coming to the rescue.

The flood transformed me into an investigative reporter. Angry about President George Bush's flyover and Mayor Ray Nagin's lies, I collected eyewitness accounts, sorted through wreckage and worked rescue boats near Memorial Medical Center near Central City. While I undertook the task of writing my account of the flood, *The Great Deluge*, my friend Spike Lee arrived in town with camera crews to make his searing HBO documentary, *When the Levees Broke*.

What became apparent to Spike and

me as we collaborated was that Katrina, in New Orleans anyway, was a man-made disaster. At least 700 fellow citizens wouldn't have died if the levee system and pumping stations had done their jobs properly.

Now, on the tenth anniversary of Katrina, a piece of concrete barricade, collected by Smithsonian Institution curators in the aftermath of the hurricane, resides, neatly tagged, at the National Museum of American History. It seems a powerful symbol to remind us how foolish Americans were to assume that a flimsy wall, only a foot thick, would be strong enough to hold back the surging floodwaters of Lake Pontchartrain.

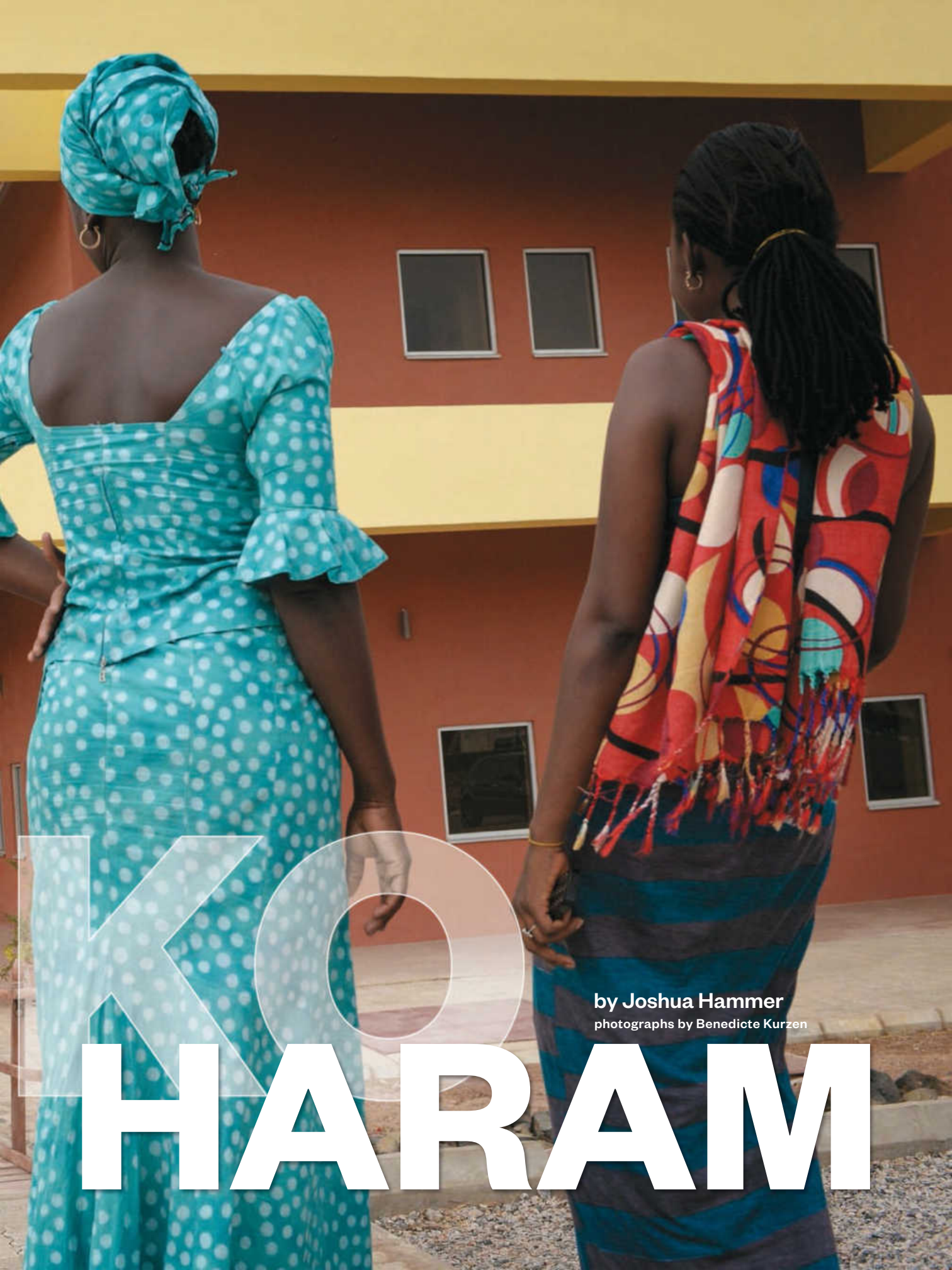
The word "Katrina" has become a euphemism signifying national dys-

function. The breached levees gave the Army Corps a black eye and notions of American exceptionalism a jarring comeuppance. The curses of corruption, apathy and misplaced civic confidence had taken a terrible toll. How blind we were to think that Nature could be controlled by a lot of poured concrete, on swishy sand and peat soil, that wasn't properly maintained. Since Katrina, billions of dollars have gone into improving Louisiana's flood-control infrastructure. New Orleans, I'm told, is protected. But in this age of climate change, the prospect of another Category 3 hurricane is very real. Let's make sure we act to guarantee that the next time the levees and pump houses don't fail. ●



ESCAPE FROM

In northern Nigeria, a brave American educator has created a refuge for young women desperate to evade the barbaric terrorist group



by Joshua Hammer
photographs by Benedicte Kurzen

KO HARAM

Shortly before six o'clock in the morning

on August 30, 2014, Margee Ensign, president of the American University of Nigeria, met with her security chief in the large house that she occupies on campus, in Yola, near the nation's eastern border, in Adamawa State. The news was bad. The chief, Lionel Rawlins, had gone to get the half-dozen security guards that Ensign was counting on to help her with a daring rescue mission, but the guards were asleep, or perhaps pretending to be, and couldn't, or wouldn't, be roused.

"They were afraid," Rawlins later recalled.

Running a college doesn't often entail making split-second decisions about daredevil forays into hostile territory, but as this Saturday dawned for the energetic five-foot California native with a doctorate in international political economy, it was gut-check time.

"The president looked at me and I looked at her, and I knew what she was thinking," Rawlins said.

"We're going," Ensign said.

So they headed north in two Toyota vans, a suddenly meager contingent—Ensign, Rawlins, a driver and one other security guard—dashing down the crumbling two-lane highway through arid scrubland, deeper into remote country terrorized by the ruthless, heavily armed militant group called Boko Haram.

Rawlins, a former U.S. Marine, had contacts with vigilante groups in northern Nigeria, and thought he might be able to summon them if the going got tough. "All the way up there I'm playing war games in my mind," he remembered.



After three tense hours on the road, expecting to be ambushed by terrorists wielding automatic rifles at any moment, the little convoy rounded a corner and Ensign saw 11 girls and their families and friends waving and yelling at the vehicles approaching in clouds of dust.

The girls had attended a boarding school near Chibok, an obscure provincial town that is now famous because of the attack on the school the previous



Ensign (at graduation in June) oversees 1,500 students and faculty from 30 nations. She describes Nigeria as “the big challenge” of her life.

April. The astonishing crime attracted attention worldwide, including the Twitter campaign #BringBackOurGirls.

On that nightmarish night of the April abduction, 57 of the 276 kidnapped girls were able to jump off the trucks that were spiriting them away, and flee into the bush. They eventually returned to their villages to spend the broiling summer with their families, fearing another kidnapping mission every night. One of

those Chibok escapees had a sister at the American University of Nigeria, and it was she who approached Ensign in her campus office, pleading, “What can you do to help?”

Ensign resolved to bring some of the girls who’d escaped to the university, where they could live and complete their secondary schooling before beginning college coursework, all on full

scholarship. The girls and their parents warmed to the idea, then risked everything to make the extraordinary roadside

rendezvous from their scattered small villages in the bush with the university president herself—an unforgettable encounter. “They were so scared, so skinny,” Ensign said of the girls. “They had no money, no food, and they had all

Deep inside me I felt that these people are not soldiers, not rescuers. . . . They were telling the girls to go and enter the car."

their possessions in little plastic bags."

As the van engines kept running, Ensign leapt out, greeted the girls and their families and told them "with cool assurance" (Rawlins' words) that all would be well. ("I didn't get the fear gene," Ensign later told me.) Quickly, about 200 locals gathered. Rawlins cast a wary glance at a group of men on the edge of the crowd whom nobody seemed to recognize. "We knew Boko Haram was in the area," Rawlins said. He turned to Ensign and the others. "We've got ten minutes," he told them. "Kiss everybody goodbye you want to kiss." Then he began a countdown for the 22 people, girls and parents alike, who would go to Yola. "Five minutes. Three minutes. Two minutes. Get in the vans!"

Long before she assumed her post in Nigeria five years ago, Ensign was a citizen of the world. She was born and raised in affluent Woodland Hills, California, the youngest of five siblings, and began traveling at an early age, from Singapore to Turkey to France. "Both my parents were airline pioneers," said Ensign. "My dad started loading bags at Western Airlines in 1940 and went on to become an executive at Pan Am. My mom was a flight attendant at Western when you had to be a registered nurse." Ensign earned her PhD at the University of Maryland, and soon



made a name for herself as an expert in economic development, especially in Africa, teaching at Columbia and Georgetown, running a management program for HIV/AIDS clinicians in East Africa, researching the causes of the 1994 Rwandan genocide. In 2009, she was teaching and serving as associate provost at the University of the Pacific when she was recruited to run the American University of Nigeria.

Ensign's job interview in Nigeria did not have an auspicious start. "I landed in Abuja, and nobody was there to pick me up," she recalls. "So I hopped in a taxi, went to a crummy hotel and somebody called me at 2 a.m. and said, 'Have you been kidnapped?' I said, 'No, I'm in a hotel.' He said, 'We've been looking for you all night!'"

Eager for a new challenge, she signed on, despite her California physician's

dire warning that her severe peanut allergy would kill her—peanuts are a dietary staple in Nigeria. (She has landed in the hospital once, following a restaurant dinner involving an undeclared peanut sauce.) She was joined in Yola at first by her daughter, Katherine, then in her early 20s, who had grown up adventurous, accompanying her divorced mother to rural Guatemala and far-flung corners of Africa. After their two-week visit, Ensign escorted Katherine to Yola's tiny airport. As the jet taxied down the runway and took off, Ensign began sobbing. "I turned around and there were hundreds of people standing around the terminal, watching. I remember thinking, 'They probably think that a crazy person has moved to Yola.' But as I walked toward the terminal, people reached out their hands and grasped mine. I knew that I would be OK there."

On the campus, Ensign settled into a four-bedroom villa (originally built for a traditional leader and his four wives), then set about remaking the university. She fired teachers, revamped security, forced out crooked contractors who were skimming millions of dollars. She commissioned buildings, including a hotel and library, started extracurricular programs, planted trees. And she required that all students spend time working directly with the underprivileged in Yola—tutoring street kids and coaching them in sports, distributing food and clothing in camps for people displaced by the fighting. The programs, she believes, serve as a strong counterweight to violent Islamist ideology. "Nobody knows any boys from Yola who joined Boko Haram," she told me, sitting at a conference table in her office, a cheerful, sunlit space decorated with a large wall map of Adamawa State and a panel of colorful Nigerian folk art.

Half a century ago, Nigeria seemed poised for greatness. Oil had been discovered in the Niger Delta in 1956—four years before independence—promising to shower the country in riches and ease tensions between the country's predominantly Muslim north and its

Christian south, a legacy of arbitrary colonial border-making. Instead, a series of rapacious regimes, both military and civilian, looted the oil riches—stealing some \$400 billion in the half century since independence, according to some sources—deepened the country's destitution and fanned sectarian hatreds.

Education in Nigeria has suffered, too. The secular education model introduced by Christian missionaries never took hold in the north, where an estimated 9.5 million children attend *almajiri*, or Islamic schools. Overall, of the nation's 30 million school-age children, about 10 million receive no instruction. Eighty percent of secondary school students fail the final exam that permits advancement to college and the literacy rate is just 61 percent. There is a federal and state college system, but it is chronically underfunded; the quality of teachers is generally poor; and only about one-third of students are female.

Ensign saw a chance to counter the corruption and dysfunction in Nigeria, which has the continent's largest economy, by educating a new generation of leaders schooled in Western values of democracy, transparency and tolerance.

Ensign "has an incredible commitment to building a nurturing environment in which students can learn," says William Bertrand, a professor of international public health at Tulane and vice chairman of the AUN board. "Her whole vision of a 'development university,' which has evolved throughout her career, is extraordinary."

In fact, the values that Ensign holds dearest—secular education and intellectual inquiry—are anathema to Boko Haram.

Boko Haram began in 2002 in Maiduguri, the capital of Borno State, the poorest and least developed corner of Africa's most populous country. Its founder, a self-taught, fundamentalist preacher, Mohammed Yusuf, who believed that the world was flat and the theory of evolution was a lie, inveighed against Western education. In 2009, following escalating skirmishes in Maiduguri between his followers and Nigeria's security forces, Yusuf was arrested and sum-

marily executed by Nigerian police. A year later his radicalized disciples, who numbered about 5,000, declared war on the government. In a wave of atrocities across the north, 15,000 people have died at the rebels' hands.

The term "Boko Haram"—*boko* translates as "Western education" in the local Hausa language and *haram* as "forbidden" in Arabic—was conferred on the group by residents of Maiduguri and the local media. (Group members prefer to call themselves Jama'atu Ahlis Sunna Lidda'awati wal-Jihad, or People Committed to the Propagation of the Prophet's Teachings and Jihad.) "Boko Haram" reflects Yusuf's deep hatred of secular learning, which, he asserted, had become an instrument for Nigeria's corrupt elite to plunder resources. That the terrorists target schools is no accident.

At the all-female Chibok Government Secondary School, a sprawling compound of squat brown buildings surrounded by a low wall deep in the bush of Borno State, nearly all the students were Christians from poor farming villages nearby. For years, Boko Haram had been kidnapping girls and young women across the state, forcing them to marry and work as slaves in its camps and safe houses. The captors subjected the girls to repeated rapes, and, in a grisly reprise of the atrocities visited upon "child soldiers" elsewhere on the continent, forcing them to take part in military operations. Less than two months earlier, Boko Haram insurgents had killed 59 when they attacked a boys' dormitory in neighboring Yobe State, locked the doors, set the building on fire and immolated the students. Those who tried to escape were shot or hacked to death. The government had subsequently shut down all public secondary schools in Borno State. But in mid-April, the Chibok school reopened for a brief period to allow seniors to complete col-

lege-entrance exams. The state government and the military had assured the girls and their parents that they would provide full protection. In fact, a single watchman stood guard at the gate on the April night that uniformed Boko Haram fighters struck.

Many girls assumed the men were Nigerian soldiers who had come to protect the school. "But I saw people without shoes, with these caftans on their necks, and I started going, 'I'm not sure,'" one 19-year-old woman recounted to Ensign in a videotaped interview. "Deep inside me I felt that these people are not soldiers, not rescuers. . . . They were telling the girls to go and enter the car, and

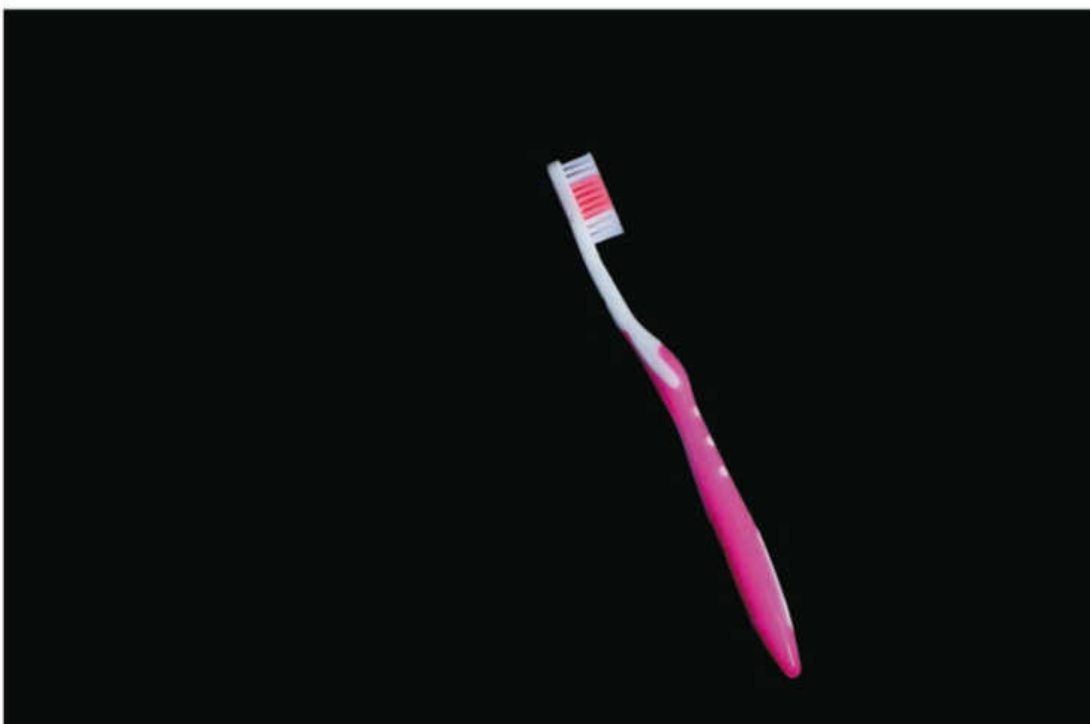
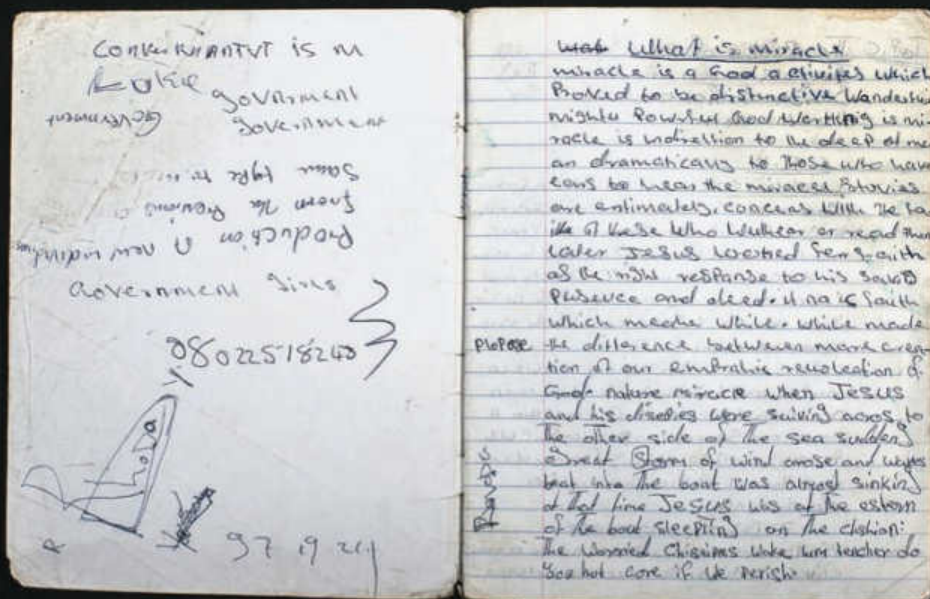
In May, Nigerian troops rescued 275 women and children from Boko Haram (including this former captive, right)—but found no Chibok girls.



I jumped through the window, I started running. I heard voices calling from behind me, 'Come, come.' I just kept on running. I was just in the bush [but] I knew I would find my way back home."

As the 19-year-old made her getaway, a dozen armed men charged into the dorm. One group guarded the girls. Another ransacked the school's kitchen and loaded vehicles with bags of rice, corn and other food. A third group set fire to the buildings. The attackers led the students out of the compound at gunpoint and into vehicles.

A handful of young women had the



Belongings left behind on the night of the Chibok abduction are a testament to terror. Rebels carrying Kalashnikovs forced girls into 20 pickup trucks.

presence of mind to grab tree branches and swing out of the truck beds to freedom. Others fled during a stop to relieve themselves in the bush. The girls ran through the pathless scrubland, past stands of acacias and baobab trees, desperately hungry and thirsty, driven by the fear of being caught at any moment. One by one, they stumbled back through the fields to their families' mud-brick houses.

Since then, Boko Haram forces have been repelled here and there, but they have not relented and none of the 219 female students held captive have been released.

Last fall, fighters advanced to within 50 miles of Yola, imposing *sharia* law in the towns they occupied, burning books, kidnapping women, conscripting young

men and executing those who resisted. Four hundred thousand people fled to Yola, doubling the city's population. "Our employees

were coming to us, saying 'I have 20 people living at my house,'" Ensign recalls. "We started giving them rice, maize and beans...and every week the numbers were getting bigger."



photographs by **GLENNA GORDON**

The Nigerian military advised Rawlins to close the campus. “The parents, students and faculty were pressuring her, saying, ‘You gotta leave,’” recalled Rawlins, who had heard that the rebels would not dare attack Yola because they were spread too thin and the city was well defended. “She remained calm and said, ‘We will do what we have to do, in the best inter-

ests of the students.’ She was vigilant and steadfast. She never wavered.” Weeks after I visited Yola, two Boko Haram suicide bombers attacked the city’s market and killed 29 people; an off-duty university security guard was badly injured. Still, Ensign remains undeterred. “I’m extremely hopeful,” she told me. “The [new] government is making all the right moves.”

The American University of Nigeria was established in 2003 with a \$40 million investment from Atiku Abubakar, a Nigerian multimillionaire businessman and the nation’s vice president from 1999 to 2007. Orphaned as a boy and educated by U.S. Peace Corps volunteers, Abubakar, who made his money in oil and real estate, remains something of a contradictory figure: Allegations of corruption have followed him throughout his career. At the same time, U.S. diplomats, educators and others say that Abubakar—known around the university as the Founder—has made a genuine commitment to improving Nigeria’s education system. “The man I’ve known for five years is devoted to education and to democracy,” Ensign told me. “I have never seen an inkling of anything that isn’t completely transparent and focused on trying to improve people’s lives.”

Yola is a hard place—a sprawl of corrugated tin-roofed houses and diesel-choked streets, fiercely hot in the summer, a sea of mud during the rainy season—and Ensign works to conjure a modicum of comfort. She has sought to surround herself with bits of home, even installing in the arts and humanities building a coffee bar called Cravings, complete with real Starbucks paper cups. “It’s our little American island,” she said. She plays squash at the University Club and jogs along the campus roads. She consumes the Italian detective novels of Donna Leon and the Canadian detective series by Louise Penny, and sometimes relaxes with DVDs of “Madam Secretary” and “West Wing.”

But the work is what keeps her going. She begins her day writing emails and discussing security with Rawlins, meets with faculty members and administrators, and teaches an undergraduate course in international development. There are weekly meetings with the Adamawa Peace Initiative, a group of civic and religious leaders she first convened in 2012. She’s also devoted to a “read and feed” program she started for homeless children who gather outside the university gates. Twice a week, under a big tree

on campus, university staff members serve meals and volunteers read books aloud. “We’re up to 75 children,” she told me. “It helps to look in their faces and see that the little we’re doing is making a difference.”

In April came a happy surprise. Over a crackling phone line in her office, Robert Frederick Smith, the founder and CEO of Vista Equity Partners, a U.S.-based private equity firm with \$14 billion under its management, said he would cover the tuition, room and board for all the Chibok girls who’d escaped or evaded the terrorists—an offer worth more than a million dollars. (Ensign had brought ten additional escapees to the university, for a total of 21.) “It was like winning a sweepstakes,” she told me. “I started crying.” Alan Fleischmann, who handles Smith’s philanthropic efforts, said the investor “was frustrated that there was an enormous outcry after the kidnappings and then it vanished. The impression was that they were dead or going to die. Then he learned that some had escaped, and said, ‘Oh my God, they are alive.’”

Thirteen months after their desperate escape from the Boko Haram marauders, three Chibok girls—I’ll call them Deborah, Blessing and Mary—sat alongside Ensign in a glass-paneled conference room at the university’s new \$11 million library. Ensign had allowed me to interview the young women if I would agree not to divulge their names and not to ask about the night of the attack. The young women seemed poised and confident, looked me forthrightly in the eye, displayed a reasonable facility with English and showed flashes of humor. They burst into laughter recalling how they gorged on a lunch of chicken and *jollof* (“one-pot”) rice, a Nigerian specialty, on their first day at the university—and then all became sick afterward. None had seen a computer before; they talked excitedly about the laptops that Ensign had given each of them, and about listening to gospel music and watching “Nollywood” movies (produced by the Nigerian film industry), Indian films and “Teletubbies” in their

dormitory in the evenings. Blessing and Mary said they aspired to become physicians, while Deborah envisioned a career in public health.

Deborah, an animated 18-year-old with delicate features, recalled the day last August when she walked for miles from her village to the rendezvous point, accompanied by her older brother. Exhausted after hiking through the night,

she was also deeply unsettled by the prospect of being separated from her family. “But my brother encouraged me,” she said. After an emotional farewell, Deborah boarded the minivan with the other girls for the drive back to Yola.

That first afternoon, Ensign hosted a lunch for the girls, and their parents, at the cafeteria. The adults fired worried questions at Ensign. “How long will you





The captives freed in May remain in refugee camps in Yola. Some malnourished children were near death when Nigerian troops finally located them.

keep them?” “Do we need to pay anything?” Ensign assured them that the girls would stay only “as long as they wanted” and that they were on full scholarships. Later, she took the girls shopping, leading them through Yola’s market as they excitedly chose clothes, toiletries, Scrabble games, balls and tennis shoes. The girls

admired their new sneakers, then looked, embarrassed, at Ensign. “Can you show us how to lace them up?” asked one. Ensign did. The campus dazzled the Chibok girls, but they struggled at first in class—particularly with English. (Their native language is Hausa, spoken by most in Borno State.) In addition

to providing the laptops, Ensign arranged for tutoring in English, math and science, and assigned student mentors who live with them in the dormitory and monitor their progress. They remain tormented by thoughts of the Chibok students who remain in captivity. Three weeks after the abductions at their school, Boko Haram’s leader, Abubakar Shekau, released a

**hey were like little kids,
and I realized, this is
what they need. They
need to capture that
fun childhood.”**

video in which he threatened to sell the girls as slaves. The escapees watched with rising hope as the world focused on the Chibok tragedy. The United States, Britain and other countries put military personnel on the ground and provided satellite surveillance of the rebels. But as time went on, the mission to rescue the girls bogged down, the world turned away from the story, and the escapees felt a crushing sense of disappointment. In April, Nigerian President-elect Muhammadu Buhari—who campaigned on a pledge to crush Boko Haram—acknowledged that efforts to locate the girls so far had failed. “We do not know the state of their health or welfare, or whether they are even still together or alive,” he said. “As much as I wish to, I cannot promise that we can find them.”

At the beginning of their time at the university, says Ensign, the Chibok women “only wanted to pray with one another.” But as the months passed, Ensign made it clear that alternatives were available to help them. “They didn’t understand the concept of counseling, but we said, ‘This is here if you want it.’” A turning point came last Christmas, when Boko Haram fighters attacked a village and murdered the father of one of the Chibok escapees at AUN. “[The

student] was totally devastated,” Ensign says. “Her mom wanted to take her home, and we said, ‘Can we work with her a little bit?’ and her mom agreed.” Ensign brought in Regina Mousa, a psychologist and trauma counselor from Sierra Leone, who met with the girl, calmed her down and made the other girls see the benefits of counseling.

Mousa set up thrice-weekly therapy sessions in the dormitory common room for groups of three to five girls, and conducted emergency individual interventions, sometimes in the middle of the night. Many of the girls, Mousa told me, were terrified of being alone, prone to collapse into sobbing, and, above all, stricken with guilt about having escaped while their friends were held captive. In therapy sessions, the girls go around the room, talking about their connections to the captives, voicing anguish as they imagine the others’ horrific lives. “I tell the girls that what happened has no reflection on them—it just happened at random, they were just in the wrong place at the wrong time,” Mousa says. “I tell them that they should now work hard, and aspire to do well so that these others will be proud, and that we’re sure that they will find them.” Recently she shared with them military and eyewitness reports “that the girls had been spotted alive in the Sambisa Forest,” a 200-square-mile former nature re-



serve 200 miles north of Yola. “That raised their hopes.”

Still, reassurance does not come easy. Boko Haram has struck the Chibok region with impunity, returning to attack some villages three or four times. Many Chibok women at the university have lost touch with family members who “fled into the bush,” says Mousa, increasing the girls’ sense of isolation. “Whenever there is an attack, we have to go through the intensive therapy again,” says Mousa. “Everything comes crashing down.”

On April 14, the one-year anniversary of the Chibok abductions, the women “were completely devastated,” Ensign recalled. “I went to meet with



See more of *Benedicte Kurzen's photo portfolio* at Smithsonian.com/nigeria



AUN students (at June commencement) earn degrees from computer science to economics. “These kids compare with the best,” says Ensign.

them. They were in each other’s arms, crying, they couldn’t talk. I asked ‘What can we do to help?’

They said, ‘Will you pray with us?’ I said, ‘Of course.’ We held hands and prayed.” Mousa met with them, too: “We talked again about the captured girls, and the need for the escapees to be strong for them and to move forward so that when the girls come back they can help them.”

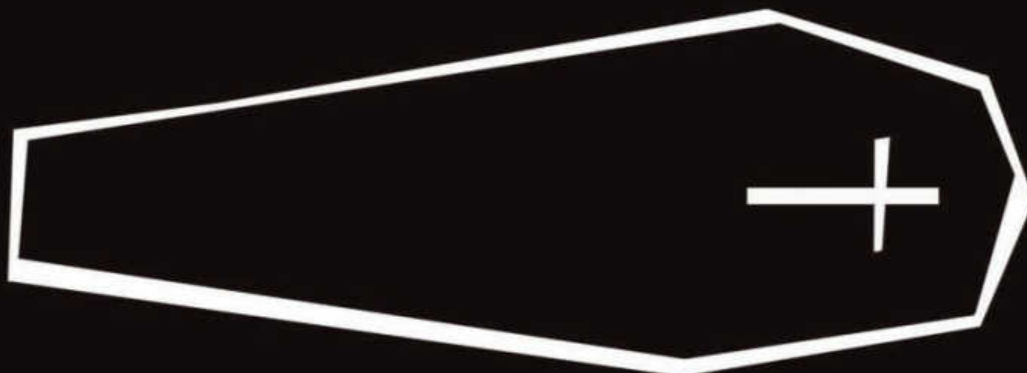
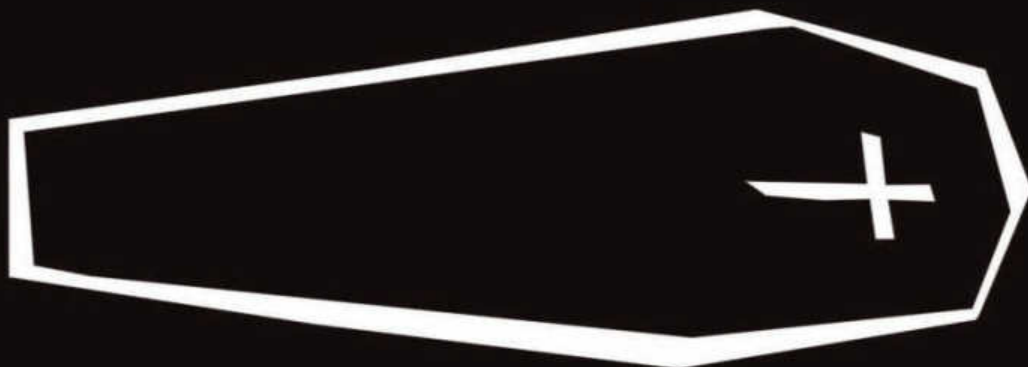
Ensign stays in close contact with the Chibok women, throwing open her office, visiting them frequently in the dormitory common room. “The girls are coming by to say hello, many times during the week,” she told me. “I have

them over to my house several times a semester for dinner.” Ensign, who calls herself “the world’s worst chef,” has her cook prepare traditional Nigerian food.

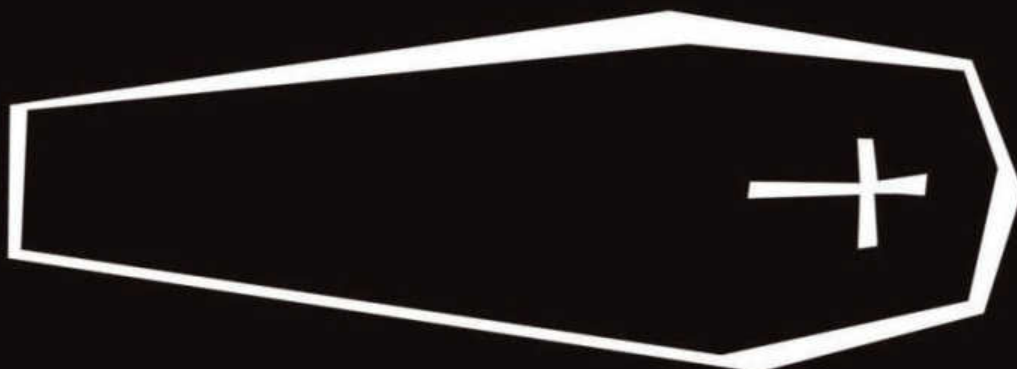
Ensign’s ambition is large—“I want to find and educate all Chibok girls who have been taken,” she told me—but she’s also a staunch advocate of the healing power of the small gesture.

One hot Sunday morning some months ago, she first took the girls down to the University Club’s Olympic-size outdoor swimming pool, and distributed the one-piece Speedo bathing suits that she had purchased for them during a break in the U.S. The girls took

one look at the swimsuits and burst into embarrassed laughter; some refused to put them on. Using gentle persuasion, Ensign—who grew up on the Pacific Coast and is a confident swimmer and surfer—nudged them into the shallow end of the pool. The girls have shown up most Sunday mornings—when the club is deserted and there are no men around. “None had ever been in the water, some were scared, most were laughing hysterically,” Ensign recalls. “They were like little kids, and I realized this is what they need. They need to capture that fun childhood.” Half a dozen of them, Ensign adds almost as an aside, have already achieved what she was hoping for: They can swim. ●



FOUR FUNERALS AND A WEDDING



JAMESTOWN, VIRGINIA: 1607

*Skeletons unearthed at
Pocahontas' wedding chapel
tell a vivid story of the near
collapse of one of America's
first settlements*

by **MARILYN JOHNSON**



NE OF THE BODIES WAS JUST 5 FEET 5 INCHES LONG, AND

missing its hands, most likely from four centuries of deterioration. It had been jostled during burial, so the head and shoulders were scrunched long before the wooden coffin lid and the weight of the dirt above had collapsed on it. Flesh no longer held the jaw shut; when this skeleton was brushed free late in 2013, it looked unhinged, as if it were howling. The bones, now labeled 3046C, belonged to a man who had come to the New World on the first trio of ships from England to the spot called Fort James, James Cittie or, as we know it, Jamestown. He survived the first wave of deaths that followed the Englishmen's arrival in May of 1607. Over the next two years, he conspired to take down one leader and kill another. This man had a murderous streak. He died, along with hundreds of settlers—most of the colony—during the seven-month disaster known as the “starving time.”

Jamestown's original fort is perhaps the most archaeologically fertile acre in the United States. In 1994, Bill Kelso, a former head archaeologist at Monticello, put his shovel in the clay soil here and began unearthing the first of two million artifacts from the early days of the settlement. His discoveries, all part of a project known as Jamestown Rediscovery, include everything from full-body armor, a loaded pistol and a pirate's grappling pike to children's shoes and tools from such a broad array of trades (blacksmith, gunsmith, mason, barber, carpenter, tailor and more) that it is clearly a myth that the settlers arrived unprepared. One firecracker revelation after another is now filling in the history of the first successful English colony in America. Kelso and his team captured international attention two years ago when they reported finding the butchered remains of a teenage girl, clear evidence that the settlers cannibalized their dead to survive during the famine. The team named the girl “Jane” and, along with Doug Owsley and the forensic anthropology lab at the Smithsonian National Museum of Natural History, reconstructed her skull and digitally recreated her face, thus populating this early dark chapter in American history. In another major find, the team uncovered the foundation of the fort's original church, built in 1608—the earliest known Protestant church in the Americas, where Pocahontas married Virginia's first tobacco farmer, John Rolfe, and brought the warring natives and settlers to a temporary truce.

This was where 3046C was laid to rest, in the winter of 1609-10. In spite of being under siege, and with food so scarce they were scavenging rats and cats and gnawing shoe leather and even, on occa-

photographs by
GREG KAHN

illustration by
ERIK WASHAM

sion, their dead, his fellow settlers gave him a fine burial in the church's chancel. A hexagonal oak coffin was made for him, a captain's staff put alongside him. Just before the dirt sealed him off for centuries, someone placed a small silver box on top of his coffin. When the archaeologist lifted it out of the trench and gave it a tentative shake, the corroded box rattled.

Three more skeletons, labeled 2993B, 2992C and 170C, have been pulled from beneath the chancel. All date to around the same time as 3046C, and though one was in a simple shroud, the other two also had splendid coffins. Who were these men? Why were they buried, not in nearby fields with the other settlers, but beneath the floor of the church's altar? Kelso and Owsley have marshaled an army of experts who have dedicated thousands of hours of scientific and archival scrutiny to the task of matching the remains with the historic record.

"We're trying to reconstruct the landscape," Kelso says. "It's a stage setting, but it's in pieces and the script has been torn up."

Now they are ready to unveil the identities of these latest Jamestown discoveries. Each has its part in the larger story of life on the edge of a New World.

On a chilly gray day in late April, Kelso urged me out of the headquarters of Jamestown Rediscovery and past the house behind the hedges where he and his wife live; I needed to see the whole site before the skies opened and drenched us. Unspoiled so far by commercial development and buffered by National Park Service land, the 22.5

acres purchased by the nonprofit Preservation Virginia in the early 1890s are dominated by monuments: an obelisk, a statue of Pocahontas and another of explorer John Smith, and a weathered replica of a brick chapel that eventually replaced the original church. They give weight to the landscape around Jamestown's original fort. The native tribes had laughed at the first Englishmen's choice of real estate. Who wanted to live in a swampland with no fresh water? But it's a beautiful spot, on a channel deep enough for multimasted ships yet far enough up the James River that its residents could anticipate attacks from their Spanish enemies.

Jamestown was England's attempt to play catch-up with the Spaniards, who had enriched themselves spectacularly with colonies in South America and were spreading Catholicism through the world. After years of war with the Spanish, financed in part by pirating their ships, England turned to the Virginia Company to launch new colonial adventures. The first 104 settlers, all men and boys (women arrived the next year), sailed with a charter from their king and a mission to find silver and gold and a passage to the Far East. They landed in Jamestown prepared to scout and mine the land and trade with the native people for food. And they did trade, exchanging copper for corn between eruptions of hostility. But as Jamestown's third winter approached, the Powhatan had limited supplies of corn; a drought was smothering their crops and diverting the once plentiful giant sturgeons that fed them. When English resupply ships were delayed, and the settlers' attempts to seize corn turned violent, the Powhatan surrounded the fort and killed anyone who ventured out. Brackish drinking water, brutal cold and the lack of food did their damage from within. Jamestown's early history is so dire it's easy to forget that it endured to become a success and the home of the first democratic assembly in the Americas—all before any pilgrims made camp in Plymouth. Abandoned in 1699 when Virginia's capital moved to Williamsburg, the colony was thought to have



sunk into the river and been lost. The first archaeologist who brought skepticism to that story, along with a stubborn determination to test it, was Kelso.

He stopped by the current excavation site and introduced me to the begrimed crew toiling in the bottom of a pit six feet deep. The archaeological work here has a temporary feel among the monuments. Visitors are separated from the excavations by a simple rope because Kelso wants the public to share in the discoveries. Nearby, the location of an early barracks has been roughed



out with lengths of saplings. Kelso has unearthed foundations that hint at the class lines imported from England: row houses built for the governor and his councilors, as well as shallow pits near the fort wall where laborers probably improvised shelters. “We’re trying to reconstruct the landscape,” Kelso says. “It’s a stage setting, but it’s in pieces and the script has been torn up.” He found a major piece when he located the fort’s original church. It was large, more than 60 feet long, the center of life for all the settlers in its day. John Smith called it

the “golden church” because, though its walls were mud mixed with black rushes and its roof thatched, two broad windows filled it with light and it was crowned with two bells. Kelso’s team has outlined the foundation with a low uneven wall using the same mud-and-stud construction the settlers would have used to make their first buildings. Four stark iron crosses mark the places where the chancel bodies lay. Each received a distinct number; a letter identified the layer of dirt in which the body was found. Kelso stood by their

Jamestown records refer to a “pretty chapel” in the fort’s “middest.” That’s just where Bill Kelso found it (outlined in mud in front of a reconstructed brick church).

resting places, now covered with crab grass and clover, as the sky darkened, a battered leather hat over his white hair.

He nodded toward the first cross, which marked the burial of 2993B, the one laid to rest in only a shroud. “Robert Hunt, the minister, was the first buried here. He came with the original settlers in 1607,” Kelso said. That first fleet to Virginia had been delayed by storms

"Everyone thought John Smith was sad because he was looking at the drowned fort," Kelso said of a 1909 statue built facing the river.





and stuck within sight of the village of Reculver in Kent, where Hunt was from, for six weeks in heavy seas—six weeks! Hunt, who from the ship would have been able to see the spires of a church he knew well, was so ill that the others considered tossing him overboard. He had already said goodbye to his two children and quit the young wife he suspected of infidelity. He'd defended himself from accusations of an affair with his servant woman. He had made his will and turned his back on England. He would get to the New World if it killed him.

A slight and strong-willed man, Hunt delivered sermons and personal appeals to keep the peace among the leaders, whose clashes and quarrels fill the narrative history of Jamestown. In early 1608, a fire raged through Fort James, destroying all of his possessions, including his precious library

The window for scrutiny is closing. "These bones were almost gone." How long will it be before this site is completely swamped?

of books. The fire might have been set accidentally by sailors who had arrived in the bitter month of January. Hunt did not complain (as John Smith wrote, "none never heard him repine"). The mariners were put to work rebuilding a storehouse and a kitchen and, while they were at it, constructing the future wedding church of Pocahontas. Hunt, who had been presiding over services outside under a stretched sail, must have taken consolation in seeing its walls go up. He died, probably of disease, within weeks of its completion.

A flock of children in matching red slickers surrounded us as the drizzle

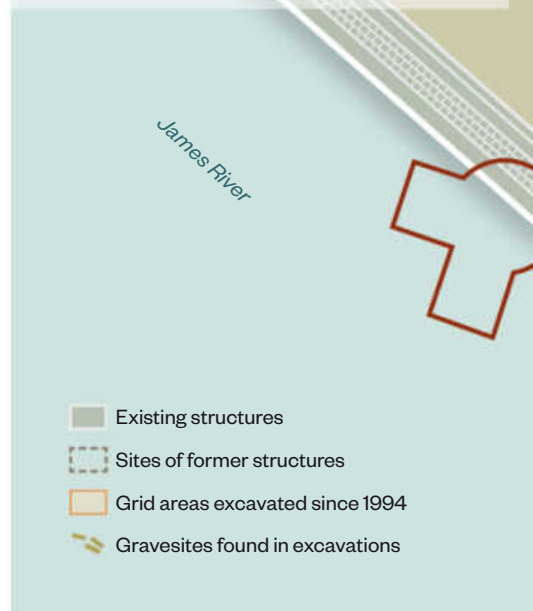
began. Two girls dragged their friend to stand by the chancel like Pocahontas at her wedding. One hovered, tightly sprung, by Kelso's side; she was dying to tell him that she wanted to be an archaeologist. Kelso, age 74 and a grandfather of four, recognized her intensity. "Study hard," he told her, "and don't let anyone talk you out of it."

All through the site, I noticed tombs and grave markers, a granite cross and dozens more of those black iron ones, evidence of the price paid by the colonists. I asked Kelso how many burials there are in Jamestown and he pulled out a map dense with tiny maroon rectangles. He started pointing them out, dozens on the side of the brick chapel and who knew how many inside . . . a trench with 15 burials near a cellar they're digging now . . . scores on the way to the visitors' café and beneath the elevated archaeology museum. Kelso's finger stopped by the far eastern border of the fort. "There don't seem to be any here," he said. Where are the bodies in Jamestown? It is easier to say where there are none.

James Horn, a British-born historian of the early colonies and president of Jamestown Rediscovery, explained to me the importance of religion to this tale, particularly England's desire to make Jamestown a base for the spread of Protestantism. "Pocahontas was a conversion story!" Horn said as Kelso and six or seven younger archaeologists and conservators gathered in Horn's office. They lowered the shades so they could present the discoveries that they had kept secret for more than a year. There was intense excitement, but the researchers took time to apologize before showing me photos of the skeletons. They are aware of how sensitive this type of work is. They are excavating graves, after all. State historic preservation officers must be involved and satisfied that there is a scientific reason for the disturbance. And though the researchers invite the public to stand at the edge of the excavations, a fence goes up as soon as human remains are involved. They try to convey respect at

Digging Jamestown

Over the past two decades, archaeologists have documented life, death and the fight to survive on the edge of a new land



every stage of unearthing and testing.

A screen lit up with a sequence of X-rays and CT scans of the "grave goods," the objects found with the best-preserved of the bodies, 3046C, now identified as Capt. Gabriel Archer. Typically in English graves of this period only royalty were buried with such grave goods, but Archer boasted two. The captain's staff was a sign of leadership. The mysterious silver box appeared to have religious significance.

Archer was a gentleman who trained as a lawyer, but he might be better characterized as a provocateur. He had been shot in both hands with arrows by



Native Americans on the day the first ships arrived in Virginia, the same day he learned that, in spite of his connections and high status and experience, including a previous expedition to New England, he had not been appointed to the colony's ruling council. John Smith, a soldier and the blunt son of a farmer, had. Their enmity was sealed, one of many "struggles between alphas," as Horn described it. The two men disagreed about whether Jamestown was the right spot for the colony (Archer said no) and how to wield power (Smith had no use for councils). They were alike in their belligerence. Ar-

cher helped unseat the first president of Jamestown, who branded him a "ringleader... always hatching of some mutiny." Smith had been in chains at least once on mutiny charges too.

When Archer finally secured a leadership position as the colony's official record-keeper, he used it to try to hang Smith. Archer called Smith's loyalty into question after two of Smith's scouts were killed in a skirmish with the natives; Smith was taken captive in the same incident, but returned unharmed. When this plot failed, Archer attempted murder, detonating Smith's pouch of gun-

powder while he slept—so historians and Smith himself believed. Smith headed back to England, where he made a surprising recovery and wrote the accounts that figure so prominently in American history, including the story, perhaps apocryphal, of his rescue from death by the young Pocahontas. He became the best known of all the Jamestown leaders. Archer died soon after the attempt on Smith's life, from the bloody flux (dysentery) or typhus or starvation.

Kelso projected a short video of Jamie May, a senior archaeologist, lifting the silver box out of Archer's grave.



“Feels like there’s something in it!” she said, shaking it. After conservationists spent more than 100 hours carefully removing corrosion with a scalpel under a microscope and polishing and degreasing its surface, the silver-copper alloy still looked battered, but a crude initial, M or W, could be seen on one side, and on the other, what looked like the fletching of an arrow. What was inside? Incredibly, the archaeologists have decided not to open the box. It is so fragile, they fear it would crumble to pieces.

Instead they are using every scientific trick to glimpse its interior.

I was scribbling in my notebook when Kelso said, “Wait, she’s not looking,” and the researchers backed up the slide show to a high-resolution, noninvasive micro-CT scan of the box’s contents: two pieces of a lead object—possibly a broken ampulla, a vessel to hold holy water—and several small pieces of bone. “Human? We don’t know. The best we can figure is mammal,” said Michael Lavin, a conservator. Lavin,

like several others on the team, has spent his entire career with Jamestown Rediscovery. “We think it’s a reliquary,” a container for holy objects, perhaps a Catholic artifact.

But hadn’t Catholicism been banished in England? Weren’t they all Anglicans? Yes, Horn pointed out, but there were still Catholics practicing underground. Rosary beads, medallions of saints and a crucifix carved on jet have also turned up at Jamestown. Gabriel Archer’s father was among the Catholics, called a



“recusant” and cited in court for failing to attend Anglican services. Archer had learned resistance at home.

And was that an M or a W inscribed on the silver box? A Smithsonian expert in microscopy scrutinized the etching and showed that the letter had been formed using four distinct down strokes. It was probably an M. One of Archer’s co-conspirators in his effort to kill John Smith had been named John Martin. Was it his silver box etched with the archer’s arrow and



Historical records and a battery of scientific tests by Kari Bruwelheide and Doug Owsley (above) reveal that the skeletons belong to (from far left) Robert Hunt, Sir Ferdinando Wainman, Capt. Gabriel Archer and Capt. William West.

left on Archer’s coffin? Was it a token of sentiment, or of defiance?

The archaeologists here find themselves at a particular moment when the artifacts can still be recovered and the technology has advanced sufficiently to extract important information. The window for scrutiny is closing, though, as the skeletons still buried deteriorate and as changing climate lifts the waters of the James River. “These bones were almost gone,” Kelso said. How long will it be before this site is completely swamped?

After Gabriel Archer died, along with most of the rest of the colonists, Jamestown came close to collapse. Survivors, so skeletal they looked, as one witness wrote, like “anatomies,” were in the act of abandoning the fort in 1610 when orders from the new governor, arriving in June with a year’s worth of food and hundreds of men, turned them back. Thomas West, known as Lord De La Warr (Delaware was named for him), marched in with a force of halberd-bearing soldiers, read his orders in the golden church, then immediately began to clean up the squalor from the starving time. He had two valued depu-

ties in this mission to revive the colony, his knighted cousin, Sir Ferdinando Wainman, and a younger uncle, Capt. William West. The relatives helped establish martial law and enforce discipline, including mandatory church attendance twice a day, and Wainman (also spelled Weyman and Wenman, among others) was given the additional responsibility in the newly militarized colony of Master of Ordnance.

Even connections and privilege and sufficient food could not protect these men from the dangers of the New World: Wainman died his first summer, probably of disease. His death was, according to one leader in the colony, “much lamented” because he was “both an honest and valiant gentleman.” His skeleton, 2992C, was found between those of Hunt and Archer. Genealogical research, conducted by Ancestry.com, reveals that Wainman had an infant daughter in England, whose christening records list multiple noble godparents. The knight had invested 100 pounds in the Virginia Company, hoping to multiply it on his adventures. When he died, Lord De La Warr saw that the stake was given to Wainman’s child.

West, only in his 20s, was killed later that year by Native Americans almost 50 miles upriver, and his body brought, with difficulty and sorrow, back to the church for burial. A close examination of West’s ribcage revealed silver threads

from a bullion fringe, which would have decorated a sword or royal sash. His skeleton, 170C, suffered the most damage over the centuries. During the Civil War, the land had been scraped to build a fort, narrowly missing the bodies, but a utility line dug in the late 1930s took part of 170C's skull.

"Jamestown is a story of luck, figuratively and literally. Over and over, lost and rediscovered, lost and saved," said Kari Bruwelheide, a forensic anthropologist at the Smithsonian Natural History Museum, where I met her in an office with a cabinet lined with skulls. Bruwelheide noted one important way that archaeology had contributed to saving the site: High-density scans of the chancel remains had been made before excavation. "Someday, you'll be able to visit this site virtually."

But what the scientists still don't know about the bodies continues to tease them. "Not a one do we have a [forensic] cause of death for," Doug Owsley told me. Owsley, the prominent forensics expert who has worked on human remains from the controversial prehistoric Kennewick Man to 9/11 and beyond, was leading me through the warren of anthropology offices and down increasingly narrow halls. He inserted a key to a locked door, and admitted me to the layout room, where every surface, including the shelves of what looked like commercial kitchen serving carts, was arrayed with human bones. He pulled two chairs up beside a skeleton from Maryland set out as part of his long-term project, an exploration of what it means to become an American through burials and bones from the 17th, 18th and 19th centuries. He and his team have data on more than a thousand skeletons from burial sites throughout the Chesapeake region (most of these remains were threatened by erosion or development). By looking at burial practices and the chemical composition and shape of bones and teeth, the researchers can learn much about a person's life. They can tell whether a woman sewed from marks in the teeth left from biting down on thread.

I set my coffee near the ribs while



Excavations at Jamestown have unearthed beads, sword hilts and nearly 100 varieties of pottery, along with more unusual finds. The silver box (top) and captain's staff (handle shown, third from top) buried with Gabriel Archer suggest he was of a high status. Chemical analyses of teeth (above) offer new clues to the past.

Owsley reflected on the De La Warr relatives, whose remains were nearby. They had the forensic marks of wealth for the period: high lead counts, which came from eating off pewter or lead-glazed dishware. "The lead levels tell us these are somebodies," Owsley said. Neither the knight nor the young captain showed the dramatic development of muscle attachments common to people involved in heavy physical labor. Wainman did have pronounced ridges on his leg bones, suggesting greater use of leg muscles, perhaps from horseback riding. Readings of oxygen isotopes, accumulated in the bones from drinking water, suggest that all the men were from the southern coastal regions of England. Of the three coffins, one had been hexagonal and two cut in at the shoulders and squared tight around the head. These two anthropoid coffins, which held the De La Warr relatives, fascinated Owsley. King James had been buried in such a coffin, which required a skilled craftsman to build, and Owsley has seen only one other from this period in North America. "Did you see the three-dimensional picture of the coffin nails? Remarkable," Owsley said. Because the wood in the coffins had decayed, only the nails remained in the dirt around the skeletons, but Dave Givens, an archaeologist and specialist in geographic information systems, had mapped their locations, marking their depth and orientation, then plotting them in a 3-D image. The nails seemed to float in space, clearly outlining the shapes of the coffins.

Strapping on a headband with a portable microscope and a light, Owsley pulled out a tray of jawbones from the chancel burials. "I'm re-editing my field notes, checking teeth to verify which sides the cavities are on," Owsley said. He explained that the longer the settlers had been in the colonies, the more decay you could see—the difference between the European diet based on wheat and the more destructive one based on the New World staple, corn. "And see?" he said, showing me the jaw with noticeably less-worn teeth. "Our young fellow [West] had one cavity. He was pretty new off the boat."

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Luckily his mandible had not been in the line of the utility trench. “I’d love to have his cranium, though,” Owsley said. He picked up 2993B, “our older man [Hunt], the minister, who would have been 35 to 40. See that tiny dark speck in the tooth there? That’s a break in the pulp. It was abscessing. That would have been weighing him down.” He set it aside and picked up Archer’s jawbones. “Now look at this: cavity, cavity, cavity, more cavities, 14 in all, teeth with enamel completely worn, a destroyed crown, broken exposed pulp chamber, two active abscesses. This guy was in agony. John Smith had returned to England after the attempt on his life because there was no surgeon at Jamestown to see to his burns, so we know there was no medical person around to pull this man’s teeth.” I remembered that

No one wanted to leave the place that so frequently delivered news of the people who founded a colony in a swamp and seeded a country with desperation and hope.

when the archaeologists uncovered him, Archer looked like he was howling.

So Owsley and his team chip away at the mysteries of the four Jamestown leaders buried with honor. The goal is to extract bits of factual evidence to piece together a larger picture, while still preserving the scientific data and guaranteeing access to it in the coming years. What we are learning now deepens our understanding of the force of religion in the early settlement, the fractious nature of leadership and how people of wealth and privilege were mourned in the wake of those great levelers, suffering and death. “Students of the future will have questions we haven’t thought of,” Owsley said.

In Jamestown, the rain fell gently as we gathered by the obelisk. The half-dozen or so archaeologists here take turns leading tours. Danny Schmidt, who started in 1994 as a high-school volunteer and is now a senior archaeologist and field manager, shepherded us to the current excavation pit, where two archaeologists were hard at work with brushes and dustpans in what appeared to be a massive cellar. Then he led us to the excavation of another cellar—the one used for trash from the starving time. “This was where we found butchered dogs and horses, a human tibia, and a few days later, most of a human cranium. Right away, we could see it had marks like those on the bones of the dogs. They belonged to a 14-year-old girl we called Jane.”

Schmidt pointed out the steps constructed for Queen Elizabeth II, so she could walk down into one of the pits. She visited Jamestown for its 350th anniversary and returned in 2007 for its 400th. Of course she is fascinated by the site. This is the birthplace of modern America and, as one of the earliest British colonies, a nursery for the empire.

Schmidt turned to the foundation of the original church, “the great-grandfather of 10,000 Protestant churches,” as he put it, now marked out with rough mud walls. “Yes, Pocahontas was married here, but not John Smith,” Schmidt said wryly. Pocahontas changed her name to Rebecca and bore a son with John Rolfe. The marriage brought seven years of peace between the Powhatan and the English and culminated in a celebrated voyage to England. But the peace ended with Pocahontas’ death as she was departing for the trip home, and she was buried in England.

Nearby, the reproduction of the brick chapel offered temporary shelter from the drizzle. The rigid class lines of English society had bent in this colony where resourcefulness and mere survivorship mattered as much as connections, and in 1619, the first elected assembly of the Americas met here. This was also where Schmidt was married, he told us. Standing on its brick floor, I pictured ghosts in ruff collars smiling down on him and his bride.

The tour ended near a shrine to Robert Hunt, though Schmidt didn’t mention the discovery of Hunt’s body (the news had not yet been made public). A knot of history lovers surrounded Schmidt, asking questions. I noticed his pocket vibrating and his hand reaching in to silence his phone. Finally, one of the archaeological team approached and caught his eye. “They found something?” Schmidt asked. Yes, they had.

We hurried past the 1607 burial grounds and Jane’s cellar to the current pit. Schmidt waved me behind the rope and, electrified, I stood with Kelso and Horn and the others while, from the bottom of the excavation, a field archaeologist named Mary Anna Richardson passed up a tray of loose brass tacks. “We kept finding these, and now it seems we’ve found a bunch in a pattern—maybe a decoration for the lid of a wooden box or a book?” The mood was festive, and someone showed the tray of stray tacks to the small crowd gathered on the other side of the ropes. America, still being discovered!

Mike Lavin, the conservator, coached Richardson on how to protect the find for the night: “Cover it lightly with soil, then upend two dustpans. We’ll pedestal it and lift the whole thing out tomorrow.” The rain was coming down steadily, and those who had hurried over from the offices and lab shared umbrellas while the archaeologists covered the pit with tarps. Horn grinned, his nice leather shoes spattered with mud. No one wanted to leave the place that so frequently delivered news of the people who founded a colony in a swamp and seeded a country with desperation and hope.

I mentioned Schmidt’s marriage in the brick chapel to Kelso—what a fitting perk for those who toiled in the graves and garbage pits of Jamestown, to celebrate life on the site of the second historic church, the one with a roof and pews. Lavin looked up. “That’s where I got married,” he said. “Me, too,” an archaeologist added, and another said, “I think we all did.”

Richardson wiped her hands on her jeans: “And I’ll be getting married there in September.”

Chicago Doctor Invents *Affordable* Hearing Aid Outperforms Many Higher Priced Hearing Aids

Reported by J. Page

CHICAGO: A local board-certified Ear, Nose, and Throat (ENT) physician, Dr. S. Cherukuri, has just shaken up the hearing aid industry with the invention of a medical-grade, affordable hearing aid. **This revolutionary hearing aid is designed to help millions of people with hearing loss who cannot afford—or do not wish to pay—the much higher cost of traditional hearing aids.**

**“Perhaps the best quality-to-price ratio in the hearing aid industry” — Dr. Babu, M.D.
Board-Certified ENT Physician**

Dr. Cherukuri knew that untreated hearing loss could lead to depression, social isolation, anxiety, and symptoms consistent with Alzheimer's dementia. **He could not understand why the cost for hearing aids was so high when the prices on so many consumer electronics like TVs, DVD players, cell phones, and digital cameras had fallen.**

Since Medicare and most private insurance do not cover the costs of hearing aids, which traditionally run between \$2,000-\$6,000 for a pair, many of the doctor's patients could not afford the expense. Dr. Cherukuri's goal was to find a reasonable solution that would help with the most common types of hearing loss at an affordable price, not unlike the **“one-size-fits-most” reading glasses** available at drug stores.

He evaluated numerous hearing devices and sound amplifiers, including those seen on television. Without fail, almost all of these were found to amplify bass/low frequencies (below 1000 Hz) and not useful in amplifying the frequencies related to the human voice.

Inspiration From a Surprising Source

The doctor's inspiration to defeat the powers-that-be that kept inexpensive hearing aids out of the hands of the public actually came from a new cell phone he had just purchased. **“I felt that if someone could devise an**

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affordable device like an iPhone® for about \$200 that could do all sorts of things, I could create a hearing aid at a similar price.”

Affordable Hearing Aid With Superb Performance

The high cost of hearing aids is a result of layers of middlemen and expensive unnecessary features. Dr. Cherukuri concluded that it would be possible to develop a medical-grade hearing aid without sacrificing the quality of components. The result is the MDHearingAid **PRO**, well under \$200 each when buying a pair. **It has been declared to be the best low-cost hearing aid that amplifies the range of sounds associated with the human voice without overly amplifying background noise.**

Tested By Leading Doctors and Audiologists

The MDHearingAid **PRO** has been rigorously tested by leading ENT physicians and audiologists who have unanimously agreed that the **sound quality and output in many cases exceeds more expensive hearing aids.**

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—Gerald Levy

*“I have a \$2,000 Resound Live hearing aid in my left ear and the MDHearingAid **PRO** in the right ear. **I am not able to notice a significant difference in sound quality between the two hearing aids.**”* —Dr. May, ENT Physician

*“They work so great, my mother says she hasn't heard this well in years, even with her \$2,000 digital! **It was so great to see the joy on her face. She is 90 years young again.**”*

—Al Peterson

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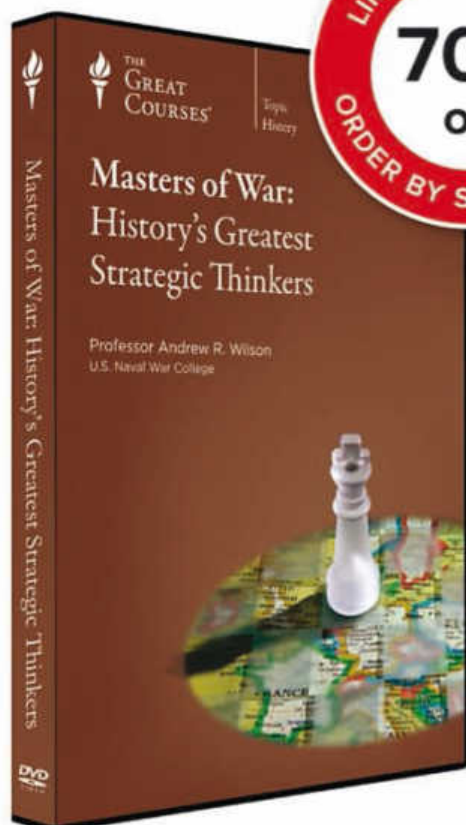
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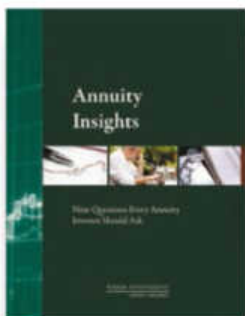
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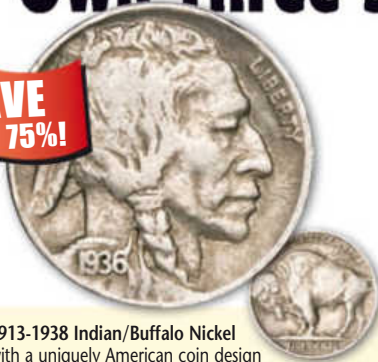
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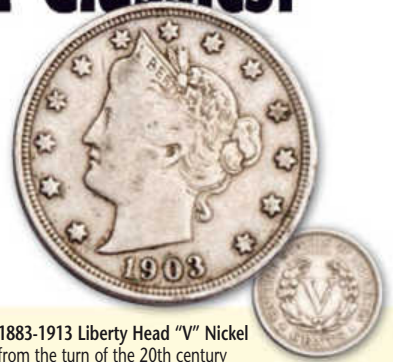
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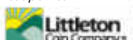
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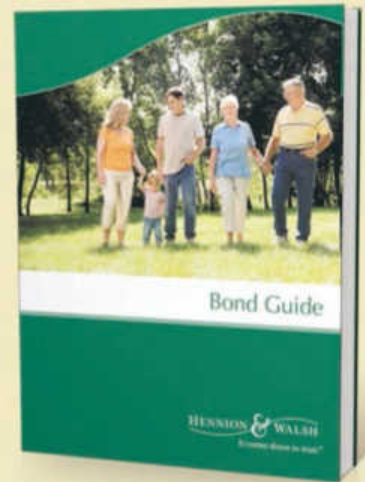
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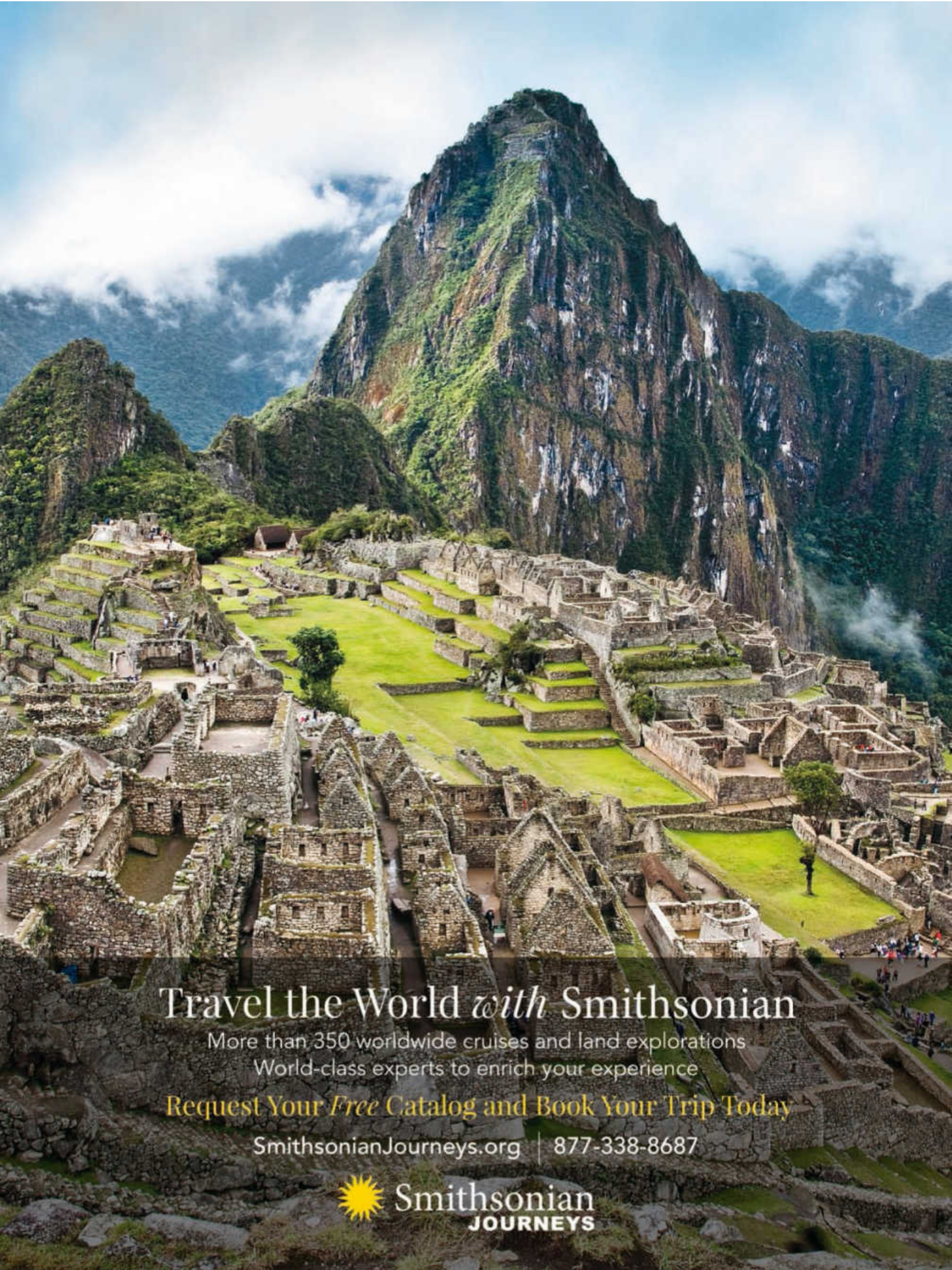
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Kudzu

CONTINUED FROM PAGE 22

scape details to one seemingly coherent mass. And because it looked as if it covered everything in sight, few people realized that the vine often fizzled out just behind that roadside screen of green.

And that, perhaps, is the real danger of kudzu. Our obsession with the vine hides the South. It veils more serious threats to the countryside, like suburban sprawl, or more destructive invasive plants such as the dense and aggressive cogon grass and the shrubby privet. More important, it obscures the beauty of the South's original landscape, reducing its rich diversity to a simplistic metaphor.

Conservation biologists are taking a closer look at the natural riches of the Southeastern United States, and they describe it as one of the world's biodiversity hotspots, in many ways on par with tropical forests. E.O. Wilson, the American biologist and naturalist at Harvard, says the central Gulf Coast states "harbor the most diversity of any part of eastern North America, and probably any part of North America." Yet when it comes to environmental and conservation funding, the South remains a poor stepchild. It's as if many have come to view the Southeast as little more than a kudzu desert. A recent study in the *Proceedings of the National Academy of Sciences* reports that while vulnerable species are primarily in the Southeast, most lands protected as federal and state parks are in the West. Tennessee, Alabama and northern Georgia (often considered centers of the kudzu invasion) and the Florida Panhandle are among the areas that the authors argue should be prioritized.

In the end, kudzu may prove to be among the least appropriate symbols of the Southern landscape and the planet's future. But its mythic rise and fall should alert us to the careless second-hand way we sometimes view the living world, and how much more we might see if we just looked a little deeper. ○

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Spirit Bears

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black bears and spirit bears." And the land bears around here spend most of their waking time in the water and get most of their protein from it, so they're semi-aquatic themselves, I suggest.

Two weeks after my visit, a Russian tanker full of oil, diesel fuel and a mix of other hydrocarbons loses power and goes adrift off the rocky coast of Haida Gwaii, the archipelago west of the Great Bear Rainforest. An American tugboat that happens to be in the port of Prince Rupert, on the Alaska border, gets to the tanker before it is dashed to pieces. Darimont emails that he is hugely relieved, but part of him wishes it had come closer to being a real disaster. The provincial government needs to realize the folly of letting tankers go up and down the Douglas Channel, he says. The Canadian government, eager to sell its tar sands bitumen to China, has green-lighted the Northern Gateway pipeline, but there is a lot of opposition to it in British Columbia, and at least 14 nations on its route from Alberta to Kitimat have vowed to fight it every step of the way.

Darimont thinks the pipeline, whether it happens or not, is a blessing in disguise, because it has united nations in the Great Bear Rainforest that at times didn't get along. With threats from hunting, climate change, overfishing and the movement of the grizzlies looming, the spirit bear and the mysterious ecoscosmos that is its home need all the defenders they can get.

After the tide went out, mother and child emerged from the forest again and ate kelp and scraped acorn barnacles off the rocks. There is a Kitasoo expression: When the tide is out, the table is set. At one point, the two of them came within ten feet of us, and acted as if we didn't exist. We sat frozen in elation, in a collective rapture, flooded with love for the bear and her cub and for each other, even though some of us, bear and human, were meeting for the first—and last—time. ○

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Smart Guard

Playing for the Arizona State University rugby team in a 2011 game, Anthony Gonzales “took someone’s hipbone to the back of my head,” he later recalled. When he got up he tried to keep playing—for the wrong team. After friends led him off the field, he was diagnosed with a bad concussion. Gonzales was lucky his friends recognized he needed help: Continuing to play after a serious head injury risks permanent brain damage, and yet student athletes report as few as 50 percent of their potential concussions to coaches.

Prompted by his own injuries, Gonzales, an MBA student at ASU, has developed FITGuard, along with fellow ASU grad Bob Merriman. The mouth guard is equipped with sensors that measure the force of a hit to the head and calculate the likelihood of a concussion based on age, gender and medical history. If a concussion is suspected, LED flashers in the front light up. At the same time, a smartphone or tablet app connected to the device uploads data describing the force of the hit, then activates a set of protocols, including tests to track symptoms like photosensitivity and memory loss, to guide coaches and parents through the crucial first minutes.

Gonzales intends to release the mouthguard in early 2016. The goal, he says, is “not to replace the physician,” but to help “identify when you need to see the physician”—and, hopefully, help keep more injured athletes from returning to the field. —BRITT PETERSON



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